VSHOOTER

VIBRATION ANALYSIS CAMERA

VSHOOTER® USER MANUAL

SYNERGYS TECHNOLOGIES

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Version 1.00 - 01/2017

MP98-01-12-16-13H56   -Trend:7/7

RV1
RV2 RV3
AX1

VSHOOTER® VBS1T - SUMMARY

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VSHOOTER® VBS1T – GENERAL SPECIFICATIONS

- **VSHOOTER® VBS1T GENERAL SPECIFICATIONS :**

  - Developed and Manufactured by:

    SYNERGYS TECHNOLOGIES
    Quartier Plessier – 32, Avenue du 8ème Régiment des Hussards – BAT21
    68130 ALTKIRCH (France)
    www.synergys-technologies.com

  - IP54
  - Temperature of use: -5°C to +40°C for device, max +120°C for sensor on machine
  - Battery: Typically 7 hours of use, recharged in 5 hours with provided charger
  - C E certified (With EMC following standards EN55011-EN61000/4-2+/4-3+/4-4+/4-6)
  - Charger: 230V-50/60 Hz > 5VDC/2A (VSHOOTER power consumption is about 6W)
  - Size (case): 426 x 290 x 159 mm (*16.77 x 11.41 x 6.26 inch),* Weight (with case): 4.8 kg
  - 2 years warranty for VSHOOTER VBS1T device, 1 year warranty for its accessories (internal battery, charger, headphones and vibration ICP sensor)

VSHOOTER® VBS1T - PACK

- ## VSHOOTER® VBS1T PACK DETAIL:

  - ➤ **1x VSHOOTER® VBS1T** device
  - ➤ **1x carrying strap**
  - ➤ **1x universal Power Charger 230V-50Hz/60Hz > 5V/2A**
  - ➤ **1x USB cable for PC connection**
  - ➤ **1x ICP accelerometer 100 mV/g with flexible BNC cable**
  - ➤ **1x strong flat magnet for accelerometer**
  - ➤ **1x strong plastic ABS case**
  - ➤ **1x stereo headphone**
  - ➤ **1x user manual**
  - ➤ **Calibration & Manufacturer certificates**

VSHOOTER® VBS1T - VIBRATION SENSOR

- **VSHOOTER® VBS1T VIBRATION SENSOR:**

  - Robust ICP accelerometer with flat magnet
  - Sensitivity of 100 mV/g
  - Flexible cable 0,5-2m with BNC output
  - IP68
  - F response: 0,5-14.000 Hz (±3 dB)
  - Dynamic range: Max 80g
  - Max T°: 120°C (Continuous)
  - Calibration check: 5g@160 Hz

VSHOOTER® VBS1T - FRONT FACE

- **VSHOOTER® VBS1T:**
  - ➢ FRONT FACE

Photo capture

Validation
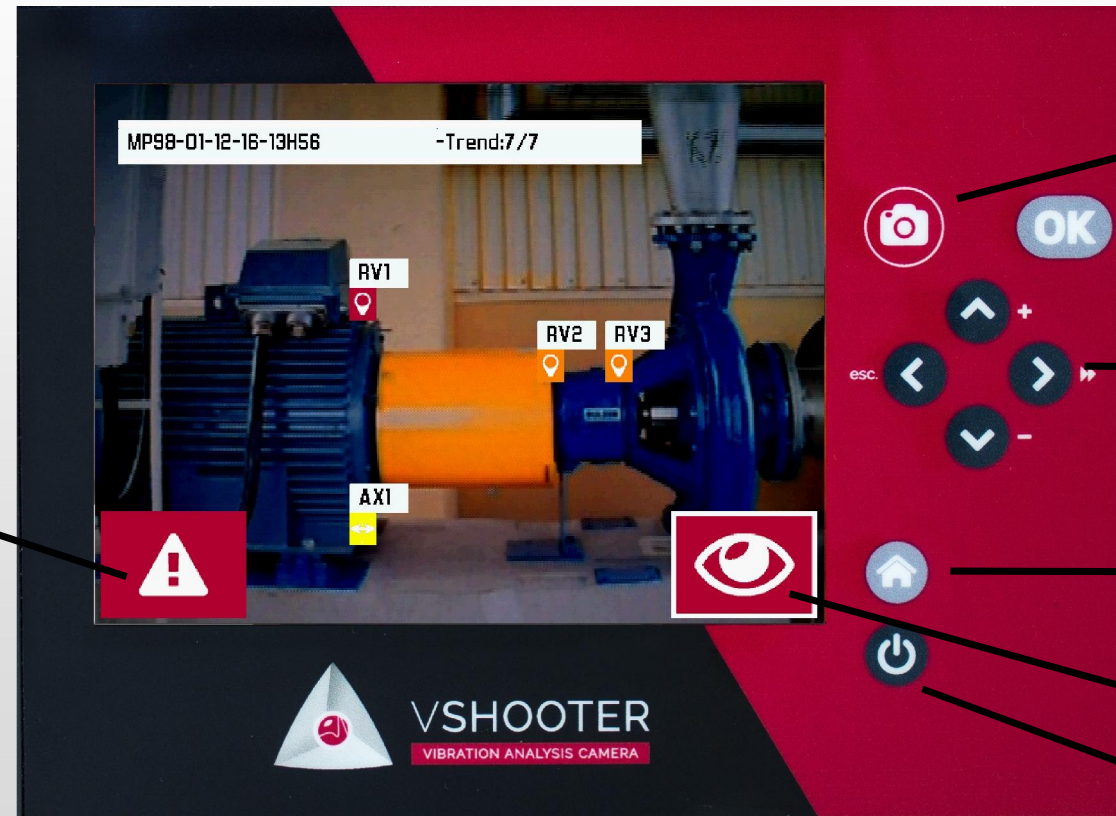
Navigation

Machine default information (Unbalance, Misalignment, Looseness, bearing shock, bearing lubrication)

HOME

Data viewing (Overall, FFT, Trend)

ON/OFF

VSHOOTER® VBS1T - REAR FACE

- **VSHOOTER® VBS1T:**
  - ➢ REAR FACE

CAMERA FOR VISION

6x LEDs FOR STROBOSCOPE

ICP ACCELEROMETER FOR VIBRATION

NETWORK POWER IN FOR BATTERY CHARGING

USB IN/OUT FOR PC CONNECTION & BATTERY CHARGING

INFRARED PYROMETER FOR TEMPERATURE
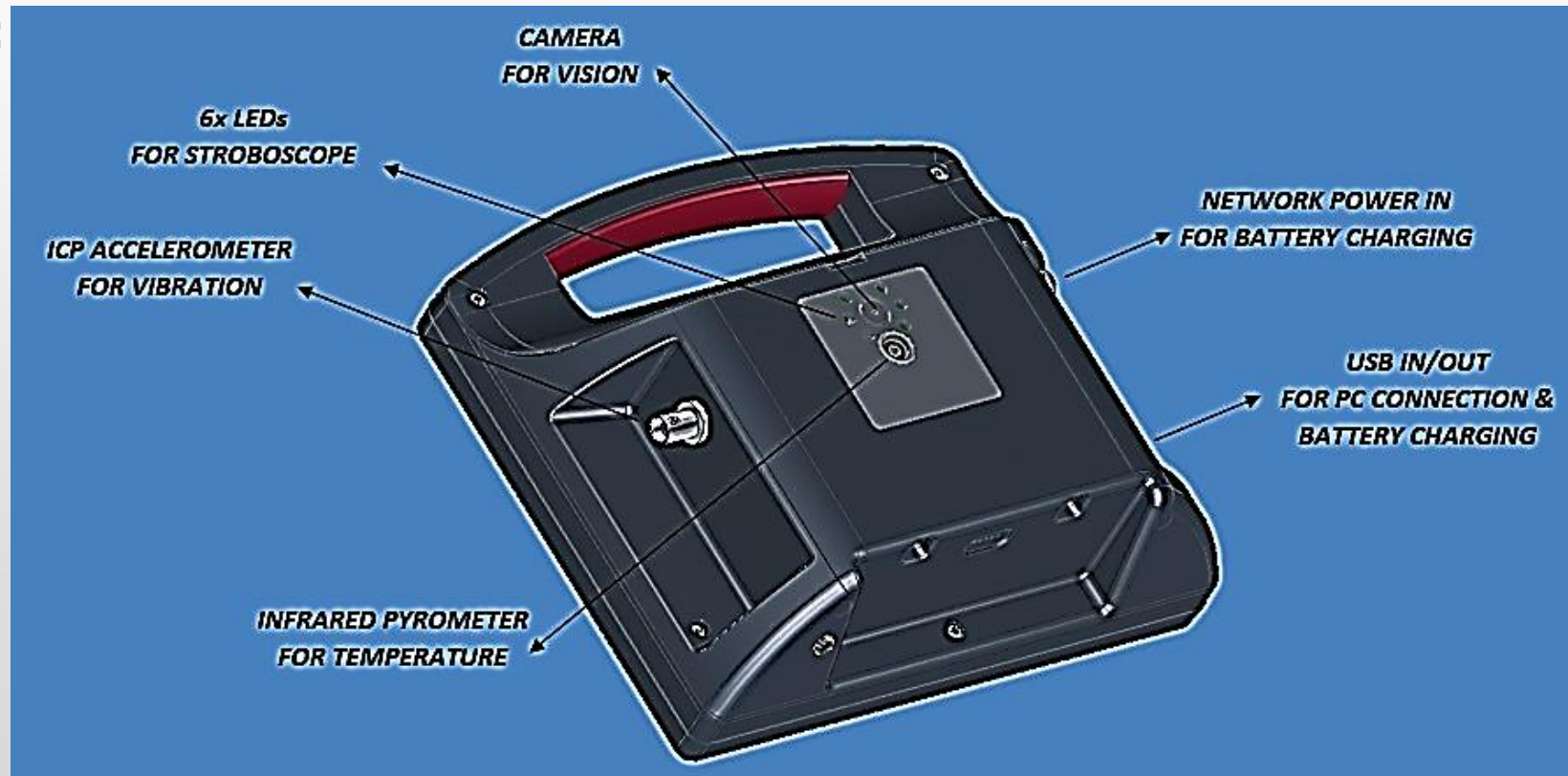
VSHOOTER® VBS1T - MEASUREMENT CAPABILITIES – OVERALL VALUES

- **VSHOOTER® - OVERALL VALUES (Metric/Imperial):**

- **Vibration acceleration A** (g) in RMS from 1.000 to 10.000 Hz (for bearing condition)
- **Vibration acceleration A** in CREST=(0-P/RMS) from 1.000 to 10.000 Hz (for bearing condition)
- **Vibration velocity V** (mm/s) in RMS from 2 or 10 to 1.000 Hz according to ISO 10816
- **Vibration displacement D** (μm) in P-P from 2 to 1.000 Hz (only in Multimeter mode)
- **Temperature T°** from 0 to 150°C with non contact infrared pyrometer (ε=1)
- **SPEED** from 30 to 30.000 RPM (0,5 Hz to 500 Hz) with LEDs stroboscope

VSHOOTER® - FFT SPECTRUM & AUTO DIAGNOSTIC (Metric/Imperial):

➤ **FFT SPECTRUM VALUES:**
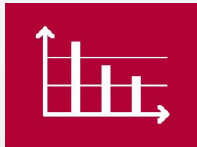
- A (g) in RMS from 2 to 10.000 Hz with information of shock (S) or lubrication (L) problems for bearing
- V (mm/s) in RMS from 2 to 500 Hz with detection of the 3 highest amplitude frequencies (Max3)

➤ **AUTO DEFAULT DETECTIONS:**

- Imbalance (1x), often in radial
- Angular misalignment (1x), often in axial (if existing COUPLING)
- Offset misalignment (2x), often in radial (if existing COUPLING)
- Looseness (3x4x5x6x7x8x), often in radial
- ? = Any other default, amplitude and frequency (F1 or F2 or F3) will be detailed (mm/s, Hz)
- Bearing shock (S) if RMS in Alert(Orange)/Alarm(Red) and CREST >4
- Bearing lubrication (L) if RMS in Alert(Orange)/Alarm(Red) and CREST <3,9

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VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

▪ <u>VSHOOTER® - HOME PAGE:</u>

➢ VIBRATION ANALYSIS PROGRAMS (With or without MCP): It launches vibration analysis programs. You can work with or without MCP (Machine condition picture).

➢ MEMORY (Data viewing <u>or</u> deleting <u>or</u> searching <u>or</u> trending <u>or</u> reporting): It allows access to all data stored in the memory.

➢ SETTINGS (Date/Clock, Sensor sensitivity, Brightness, USB mode, Units, Headphones): It allows access to standard device settings.

VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

▪ **VSHOOTER® - COUPLING OR NO COUPLING?:**
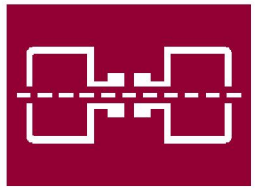
➢ MACHINE WITH COUPLING: It allows to check shaft alignment problems in AUTO DIAGNOSE mode via detection of angular or/and offset gap vibration problems.

➢ MACHINE WITHOUT COUPLING: It forbids to check shaft alignment problems in AUTO DIAGNOSE mode (no angular and no offset gap vibration problems).

VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- ## VSHOOTER® - VIBRATION ANALYSIS MODES:

> MCP MODE (Machine Condition Picture MODE with photo capture): It allows to start MCP measurement mode. Measurements with MCP can be saved in memory.

> MULTIMETER MODE (Without MCP, so without photo): It allows to start MULTIMETER measurement mode. Measurements without MCP can not be saved in memory.

VSHOOTER® VBS1T - ICONS

These below icons are static icons, not selectable.

- ## VSHOOTER® - "MEASUREMENT" PAGE ICONS (1):

  - > Vibration measurement (RMS-V(mm/s) with 2 or 10-1000 Hz filter or Peak to Peak-D(µm) with 2-1000 Hz filter (only in Multimeter mode), chosen during "ISO Settings" Menu)

  - > Bearing condition measurement (RMS-A(g) 1000-10000 Hz & CREST-A(w/o unit) 1000-10000 Hz)

  - > Rotation speed measurement ((Rpm & Hz), using INTERNAL STROBOSCOPE or MANUAL ENTRY)

  - > Temperature measurement (T° Celsius or T° Fahrenheit, using INTERNAL PYROMETER)

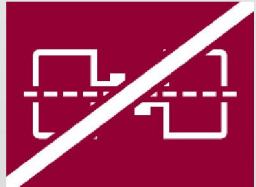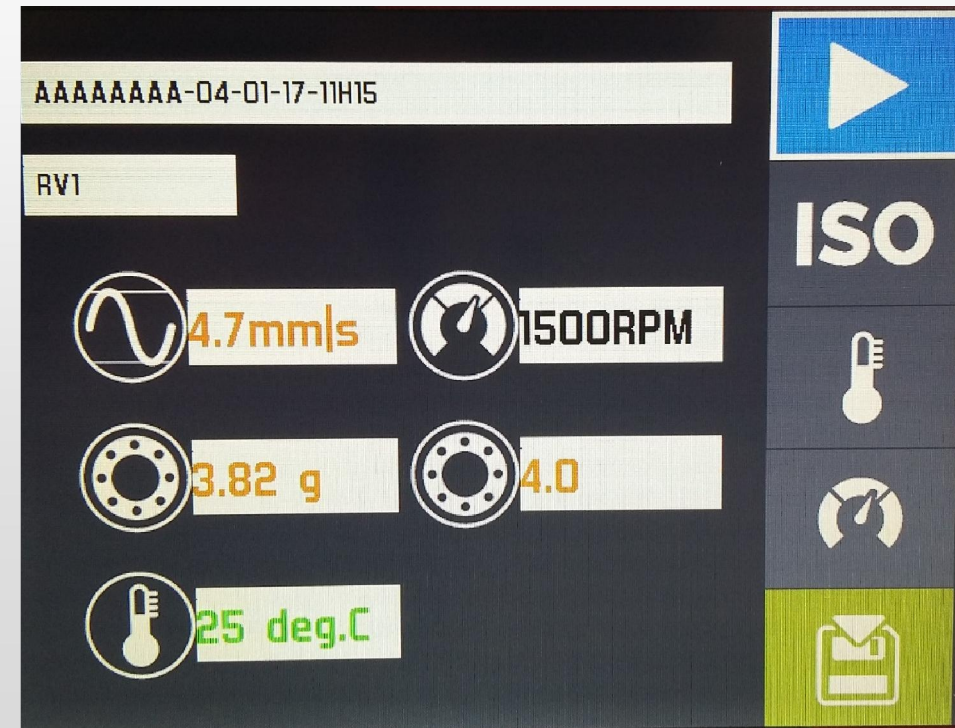AAAAAAAA-04-01-17-11H15

RV1

ISO

4.7mm|s   1500RPM

3.82 g   4.0

25 deg.C

VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- **VSHOOTER® - "MEASUREMENT" PAGE ICONS (2):**
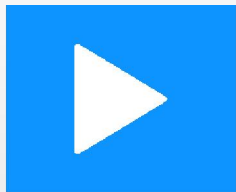
➤ START / WAIT for measurements.
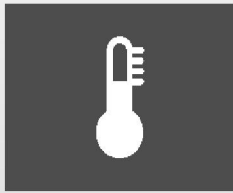
➤ SPEED measurement, T° measurement and ISO SETTINGS (CLASS+FILTER+ALARM activation or deactivation (V, A, T)).

➤ STORE DATA IN MEMORY (for each measurement point).

➤ CAREFUL: FFT AUTO DIAGNOSE is taken because of Alert (orange) or Alarm (red) in V and/or A. This icon only appears after Alert (orange) or Alarm (red) detection in V and/or A. Only appears during measurement in place of WAIT icon.

AAAAAAAA-04-01-17-11H15

RV1

4.7mm|s   1500RPM

3.82 g   4.0

25 deg.C

ISO

VSHOOTER® - FFT AUTO DIAGNOSE :
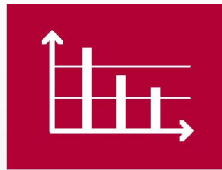
➤ Possible Unbalance detected (often radially) **(H1;x1RPM)**

➤ Possible Offset misalignment detected (often radially) **(H2;x2RPM)**

➤ Possible Angular misalignment detected (often axially) **(H1;x1RPM)**

? ➤ Any ordinary frequency **(F1-F2-F3)**, ≠ Harmonics

➤ Possible Looseness detected **(H3 to H8;x3RPM to x8RPM)**

➤ Possible Bearing problem detected (**L** for possible lubrication problem and **S** for possible shock problem)

Check on your machine if there is more Axial or Radial vibration at x1RPM, to confirm if it is more an unbalance or more a misalignment problem.

VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

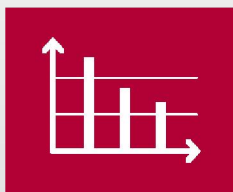- ## VSHOOTER® - GENERAL ICONS (1):

➢ **ADD NEW MEASUREMENT POINT** to be placed on the MCP (Machine Condition Picture): It places the measurement point on the picture with the joystick aim. **Maximum is 10 points** for one MCP.

➢ **FFT AUTO DIAGNOSE** results: It gives detailed information regarding the machine defaults. It is only taken when you have Alert (orange) or Alarm (red) in overall V-RMS & A-RMS values. Available in WITH and in WITHOUT MCP modes.

➢ **TREND VIEW:** It shows the trend evolutions of V(RMS)-A(RMS & CREST)-T; **TREND CURSOR:** It shows the value/date for each measurement in one trend.

➢ **MEASUREMENT RESULTS DETAIL:** It shows all measurement values in a table (if with only one date) and with **TRENDS** (if with several dates). You also have access to **FFT AUTO DIAGNOSE** if you got an Alert (orange) or an Alarm (red).

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VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- **VSHOOTER® - GENERAL ICONS (2):**

> FILE DELETION: It allows to delete a selected file in memory.

> STROBOSCOPE MODE or MANUAL RPM MODE: It is used when you need machine RPM information (necessary for AUTO DIAGNOSE FFT) .

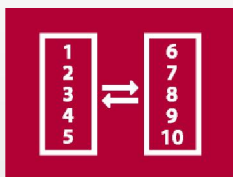> GO BACK TO MCP VIEW: It allows to go back to MPC view when you are on RESULTS DETAILS page.

> VALIDATION: It validates the settings you have made in a page.

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VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- ## VSHOOTER® - GENERAL ICONS (3):

 ➢ ALTERNATE between table 1 (5 first measurement points) and table 2 (1 to 5 measurement points). Alternation is made by selecting this icon and clicking on buttons.

 ➢ DATA REPORT EDITION: It is used to edit a report (.rpt) from an existing project (.prj). You can download this report file on your PC (via USB) to edit/store/print it (HTML file) or to open/edit it in WORD to make your own report.

 ➢ ALARM REPORT EDITION: It is used to edit an alarm list report (.rpt) from global in memory machine list. You can download this report file on your PC (via USB) to edit/store/print it (HTML file) or to open/edit it in WORD to make your own report.
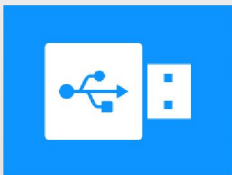
VSHOOTER® VBS1T - ICONS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- ## VSHOOTER® - MAIN MENU - GENERAL SETTINGS ICONS:

  ➢ UNITS, BRIGTHNESS, CLOCK settings

 ➢ USB MODE: It allows to connect VSHOOTER VBS1T to PC with USB cable (REPORTING, DATA SAVING).

  ➢ HEADPHONES SOUND LEVEL setting, SENSOR SENSITIVITY setting.

VSHOOTER® VBS1T - COLOR CONDITION – W/O ALARM

- **<u>VSHOOTER® W/O ALERT/ALARM (To be setted under</u>** **ISO** **<u>):</u>**

  - You can deactivate V, A, T alert/alarm threshold limits in your VSHOOTER. Measurements will be so taken with grey/black color.
  - Spectrums are taken automatically if you have deactivated V and A alarms.
  - Go under ISO icon, select CLASS, FILTER, ALARM with joystick keyboard and OK button. After each modification (OK for each), click on RIGHT button to move to next (CLASS to FILTER to ALARM V to ALARM A to ALARM T to BLUE icon).
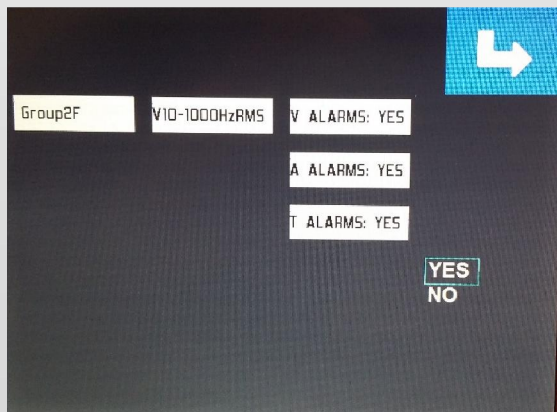
Ex: V (mm/s) alarm is deactivated here.

VSHOOTER® VBS1T - COLOR CONDITION – ISO 10816

- **VSHOOTER® ALERT/ALARM WITH ISO 10816-3 and ISO 10816-7 (ISO):**

  - ISO GROUP DETAIL: 10816-3 for Motor/Screw compressor/Blower/Fan and 10816-7 for Pump

    ISO 10816-3 (for Motor, Screw compressor, Blower, Fan):
    - Group1= Large machine with power >300 KW and <50MW (With foundation r=rigid, f=flexible)
    - Group2= Medium machine with power <300 KW (With foundation r=rigid, f=flexible)

    ISO 10816-7 (for Pump):
    - Cat1= Critical rotodynamic pumps (With power L<200 KW , H>200KW)
    - Cat2= Less critical rotodynamic pumps (With power L<200KW, H>200KW)

    For speed > 600 RPM use 10 - 1000 Hz filter, for speed > 120 RPM use 2 - 1000 Hz filter (with V-RMS).

VSHOOTER® VBS1T - COLOR CONDITION - ISO 10816

- **VSHOOTER® ALERT/ALARM WITH ISO 10816-3 and ISO 10816-7:**

➢ ISO (V(mm/s) - RMS):

On 2 or 10 - 1000 Hz filter

GROUP 1 & 2	OK	ACCEPTABLE	ALERT	ALARM
RIGID R1	2.3	4.5	7.1	> 7.1
FLEXIBLE F1	3.5	7.1	11	> 11
RIGID R2	1.4	2.8	4.5	> 4.5
FLEXIBLE F2	2.3	4.5	7.1	>7.1

CATEGORY 1 & 2	OK	ACCEPTABLE	ALERT	ALARM
CAT1L <200 kw	2.5	4.0	6.5	> 6.5
CAT1H >200 kw	3.5	5.0	7.6	> 7.6
CAT2L <200 kw	3.2	5.1	8.5	> 8.5
CAT2H >200 kw	4.2	6.1	9.5	> 9.5

VSHOOTER® VBS1T - COLOR CONDITION - A (g) RMS

VSHOOTER® ALERT/ALARM:

➤ Bearing condition (A(g) - RMS):

On 1000 - 10000 Hz filter

RPM	OK	ACCEPTABLE	ALERT	ALARM
<499	0 to 0,2	0,21 to 0,5	0,51 to 1,7	> 1,71
500 to 749	0 to 0,35	0,36 to 0,7	0,71 to 2,1	> 2,1
750 to 999	0 to 0,5	0,51 to 1	1,1 to 3,5	> 3,5
1000 to 1249	0 to 0,6	0,61 to 1,1	1,2 to 4,5	> 4,5
1250 to 1499	0 to 0,8	0,81 to 1,3	1,31 to 5,1	> 5,1
1500 to 1749	0 to 0,9	0,91 to 1,5	1,51 to 6	> 6
1750 to 1999	0 to 1	1,1 to 1,7	1,71 to 7	> 7
2000 to 2499	0 to 1	1,1 to 1,8	1,81 to 7,5	> 7,5
2500 to 2999	0 to 1,2	1,21 to 2	2,1 to 8	> 8
3000 to 3499	0 to 1,35	1,36 to 2,2	2,3 to 10	> 10
3500 to 3999	0 to 1,5	1,51 to 3	3,1 to 11	> 11
4000 to 4999	0 to 2	2,1 to 4	4,1 to 14	> 14
5000 to 7499	0 to 3	3,1 to 6,5	6,6 to 20	> 20
7500 to 9999	0 to 4,5	4,6 to 8	8,1 to 26	> 26
> 10000	0 to 4,5	4,6 to 8	8,1 to 26	> 26

▪ **VSHOOTER® ALERT/ALARM:**

➢ **Bearing condition (A-CREST):**

On 1000 - 10000 Hz filter

(CREST = O-PEAK/RMS)

1 to 2,5	OK
2,6 to 3,9	ACCEPTABLE
4 to 5,9	ALERT
> 6	ALARM

≈ LUBRICATION

≈ SHOCK

➢ **Temperature (°C, Ɛ=1):**

On "bearing housing"

< 35	OK
36-46	ACCEPTABLE
47-67	ALERT
> 68	ALARME

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▪ VSHOOTER® - HOME PAGE:

➢ **MEASURE ICON (1):**

Switch ON with *, wait about 5 seconds.*

Start a new project with or without MCP (Machine Condition Picture) by selecting the icon (1) with   *and valid it with* *.*

You can also see, in the up & right corner, the battery status in %. "Load" information if in charge.
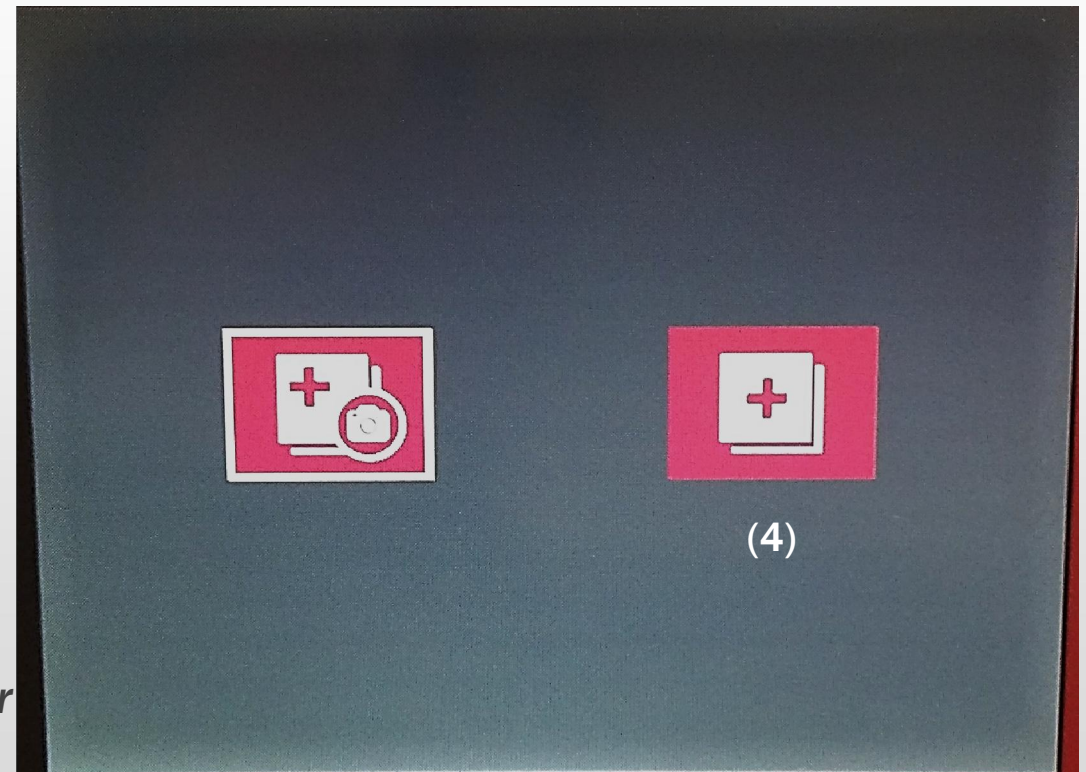

(1)
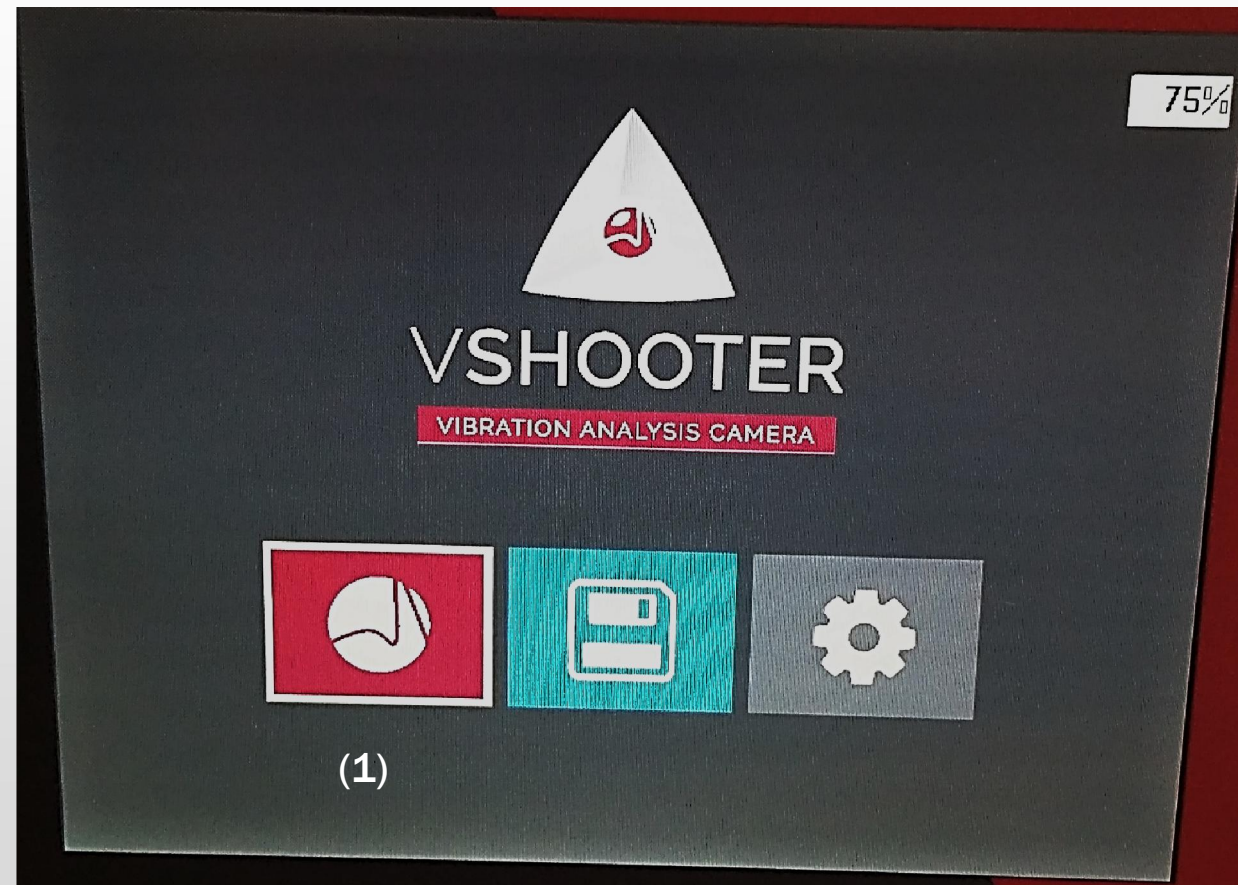
VSHOOTER® VBS1T – COUPLING OR NO COUPLING?

All these icons below can be selected with joystick and validated with OK keyboard buttons.

▪ <u>VSHOOTER® - COUPLING?:</u>

➢ **MEASURE WITH COUPLING (2):**

Your machine has a direct coupling.

➢ **MEASURE WITHOUT COUPLING (3):**

Your machine has no direct coupling

(belt transmission or else)

This will help to valid or not the presence of

MISALIGNMENT in the AUTODIAGNOSE.

(Angular and Offset misalignment at 1x, 2x)

(2)   (3)

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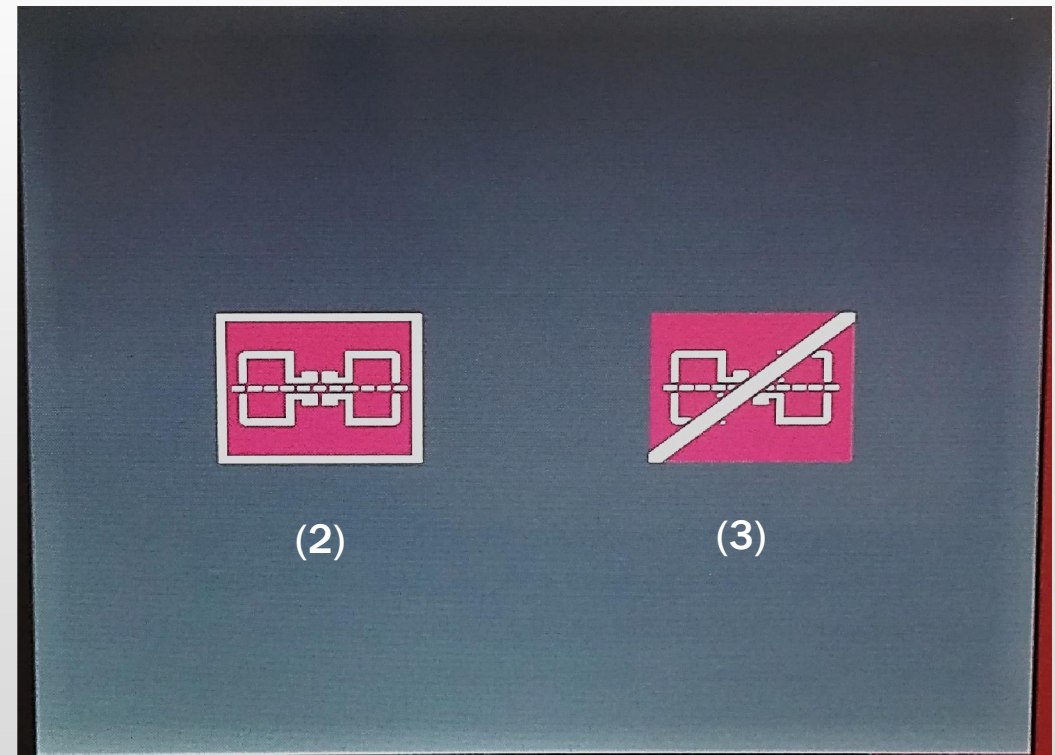
VSHOOTER® VBS1T – MEASURE WITHOUT MCP

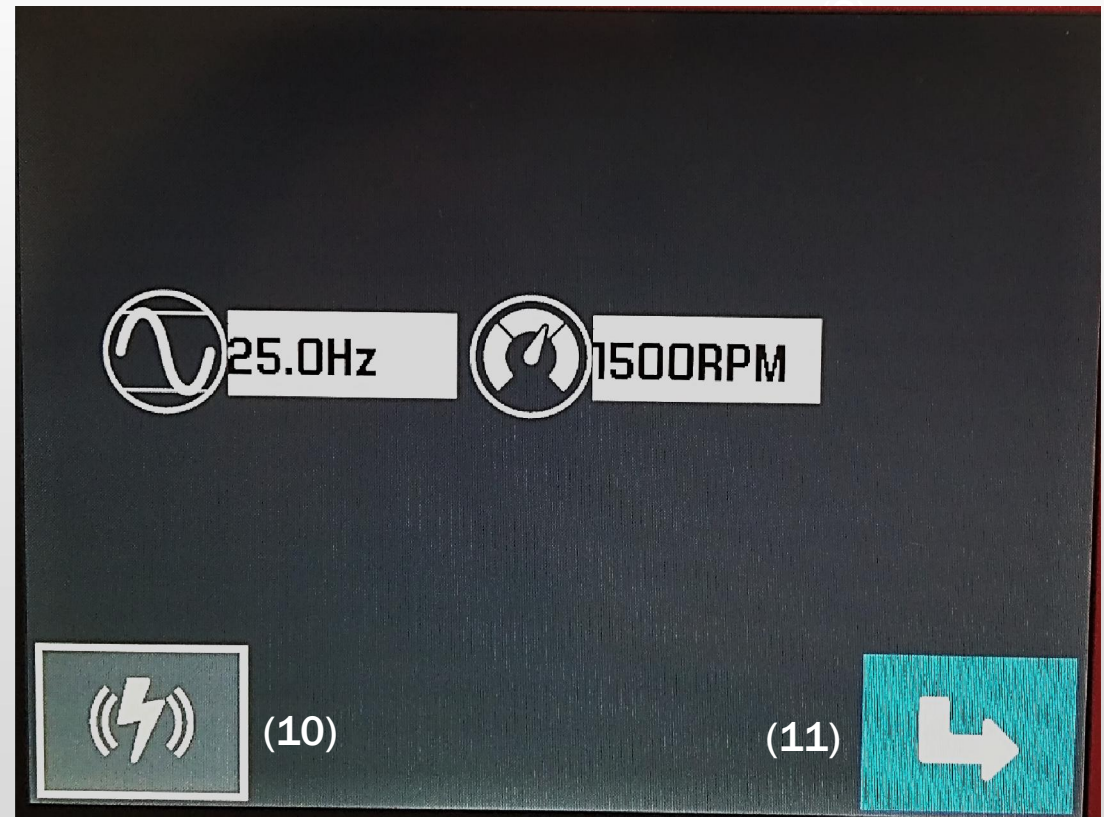### All these icons below can be selected with joystick and validated with OK keyboard buttons.

▪ **VSHOOTER® - WITHOUT MCP:**

➢ **MEASURE WITHOUT MCP (4):**

You can measure all data, without Machine

Condition Picture (MCP). Here, it is not possible

to store data in memory. It is a only special

MULTIMETER MODE for a fast checking.

Auto Diagnose Alarm FFT is made (please inform your

RPM machine speed (±30RPM)).

(4)

- **VSHOOTER® - WITHOUT MCP:**

➤ **WHAT CAN YOU MEASURE?**

- *ISO V-RMS vibration (mm/s) or D-Peak-Peak vibration (µm)*
- *RPM (Manual or Stroboscope)*
- *A-RMS bearing (g)*
- *A-CREST bearing (no unit)*
- *T°(infrared pyrometer)*
- *Alert/Alarm FFT (5): V & A (for bearing)*

VSHOOTER® - WITHOUT MCP:

➢ **HOW DOES IT WORKS - GENERAL?**

Before starting measurement (6), please check

the ISO settings (7) (*).

RPM (9) is also important to be checked if you

want a right AUTO DIAGNOSE RESULT (5)(**).

You can also take the temperature T° (8).

**Standard RPM value is 1500.

*Standard ISO is Group2F with 10-1000 Hz filter.

(6)
(7)
(8)
(9)
(5)

VSHOOTER® - WITHOUT MCP:

➢ HOW DOES IT WORKS - RPM?

When you click on RPM icon (9), you will

have this menu.

With **OK** *, you switch between MANUAL and*

STROBOSCOPE mode (10).

Modify RPM values with ⌃ *and* ⌄ *keyboard*

buttons. When it is OK for you, valid with BLUE

icon (11), with > *&* **OK** *.*

▪ VSHOOTER® - WITHOUT MCP:

➢ HOW DOES IT WORKS - TEMPERATURE?

When you click on T° icon (8), you will have this menu. T° is colorized thanks to its value. You can measure the temperature T° with the infrared sensor, T° is taken around cross (*). It is an approximate T° measurement with a ε=1 (emissivity factor). Valid value with **OK**.

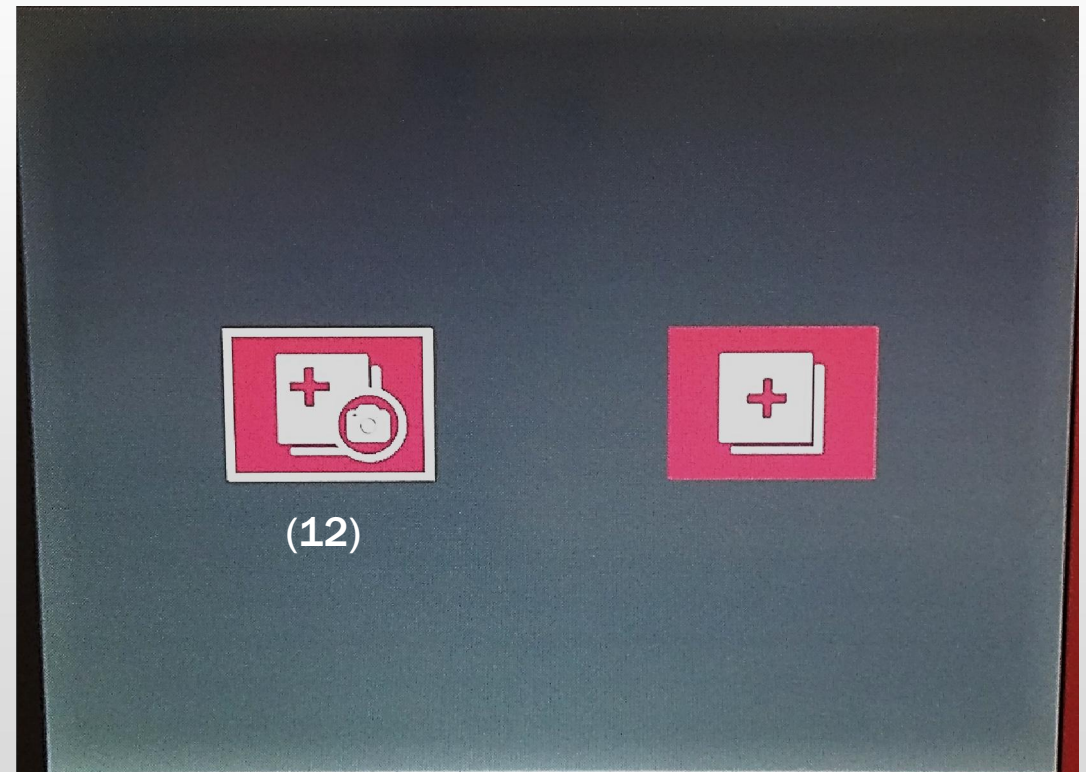*The best capture distance is from 0,15m to 0,3m. Valid page with BLUE icon (11).*
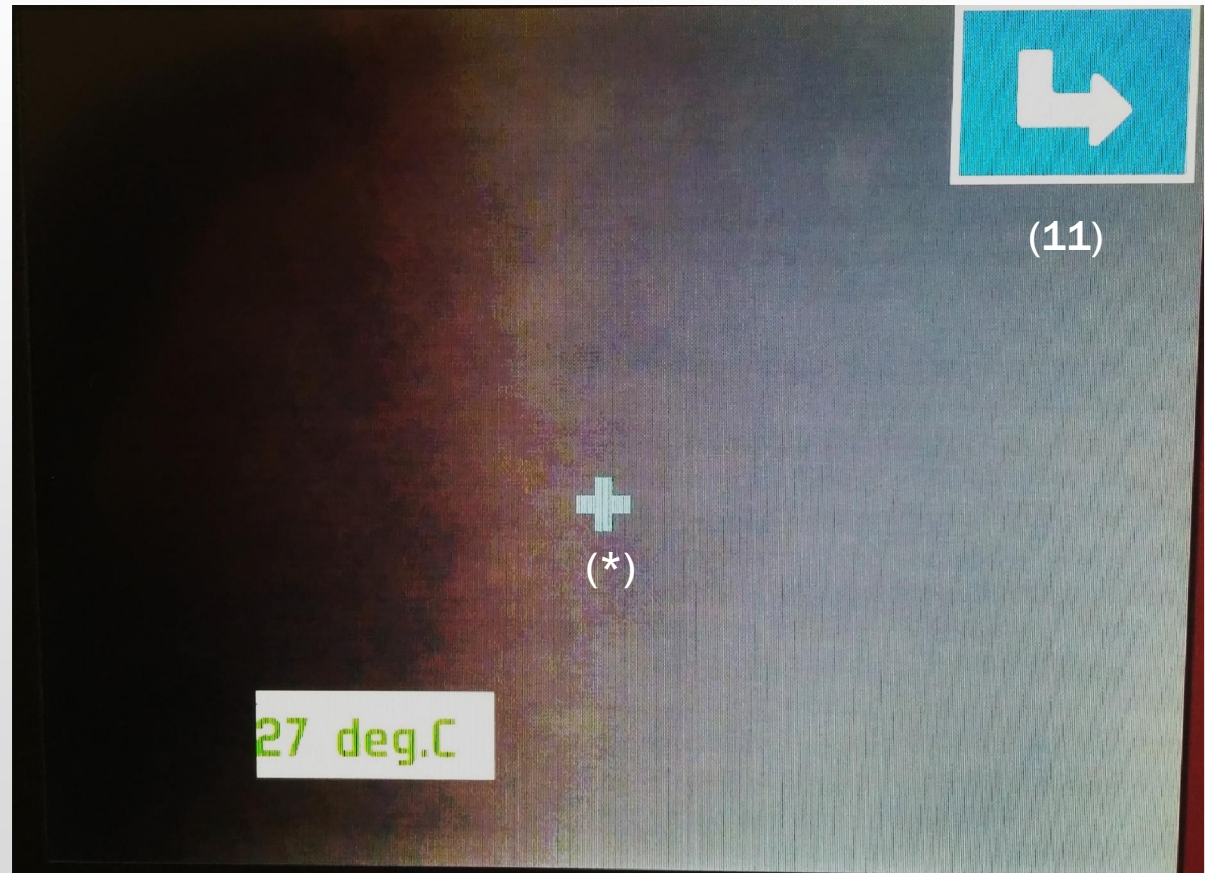
▪ **VSHOOTER® - WITH MCP:**

➢ **MEASURE WITH MCP (12):**

You start by taking the machine picture,

then by collecting all measurements points to

create your MACHINE CONDITION PICTURE

(MCP). This MCP can be stored in the memory

and can be updated in time (TRENDING).

Of course, you can also make a report of it.

(12)

VSHOOTER® VBS1T – MEASURE WITH MCP

All these icons below can be selected with joystick and validated with OK keyboard buttons.
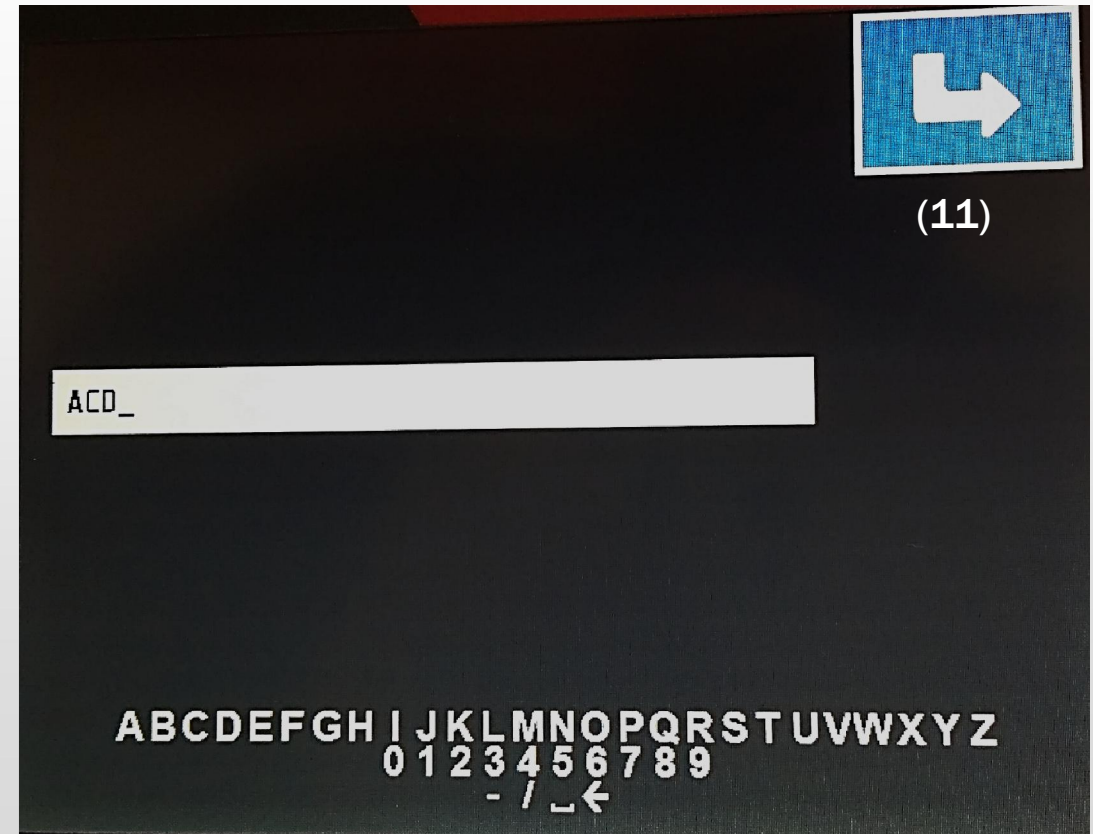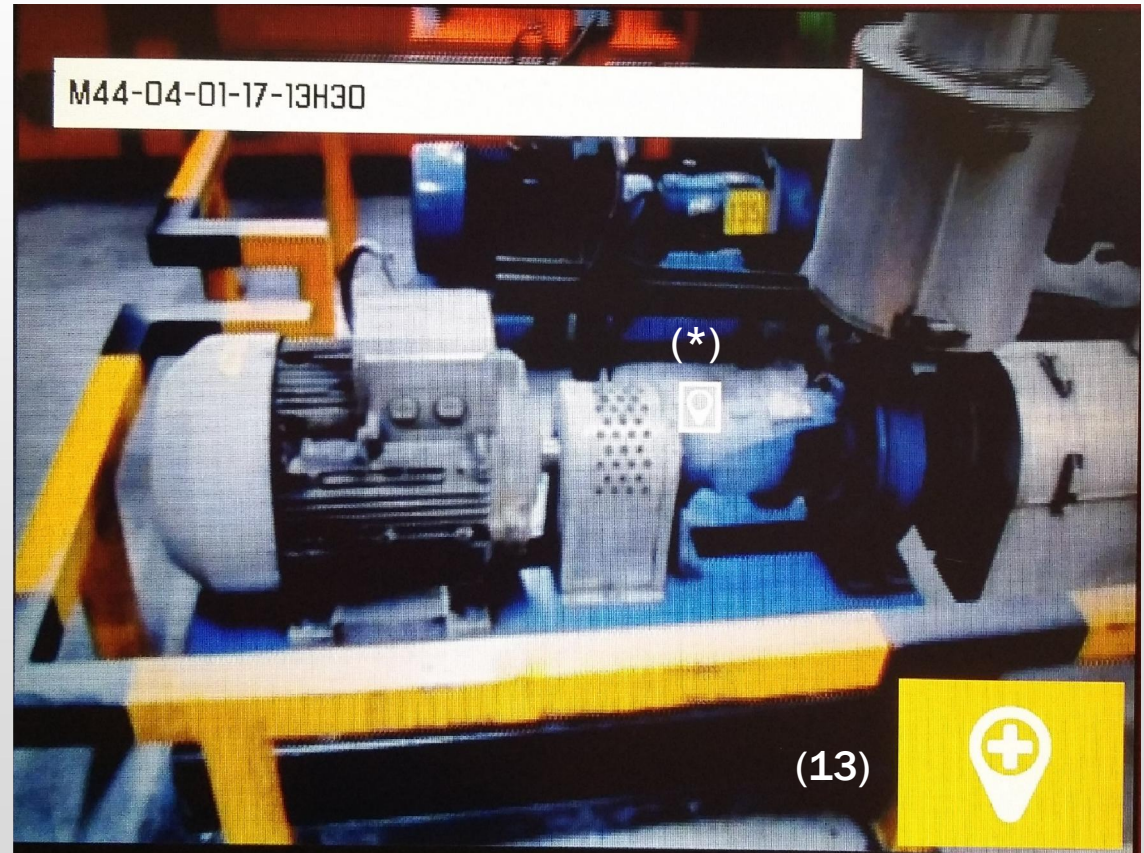
- ## VSHOOTER® - WITH MCP:

- ### MACHINE NAME:

You are invited to give a machine name with

the joystick keyboard and **OK** .

Then you valid name with the BLUE (11) icon(*).

With ⌃ , *you will get the BLUE (11) icon.*

Then click on **OK** .

(11)

VSHOOTER® VBS1T – MEASURE WITH MCP

- ## VSHOOTER® - WITH MCP:

- ➤ **PHOTO CAPTURE:**

You are invited to take machine picture with

. If photo is not OK, you can take it again

with *.*

If machine photo is finally OK, you valid it with

. You will then have this screen.
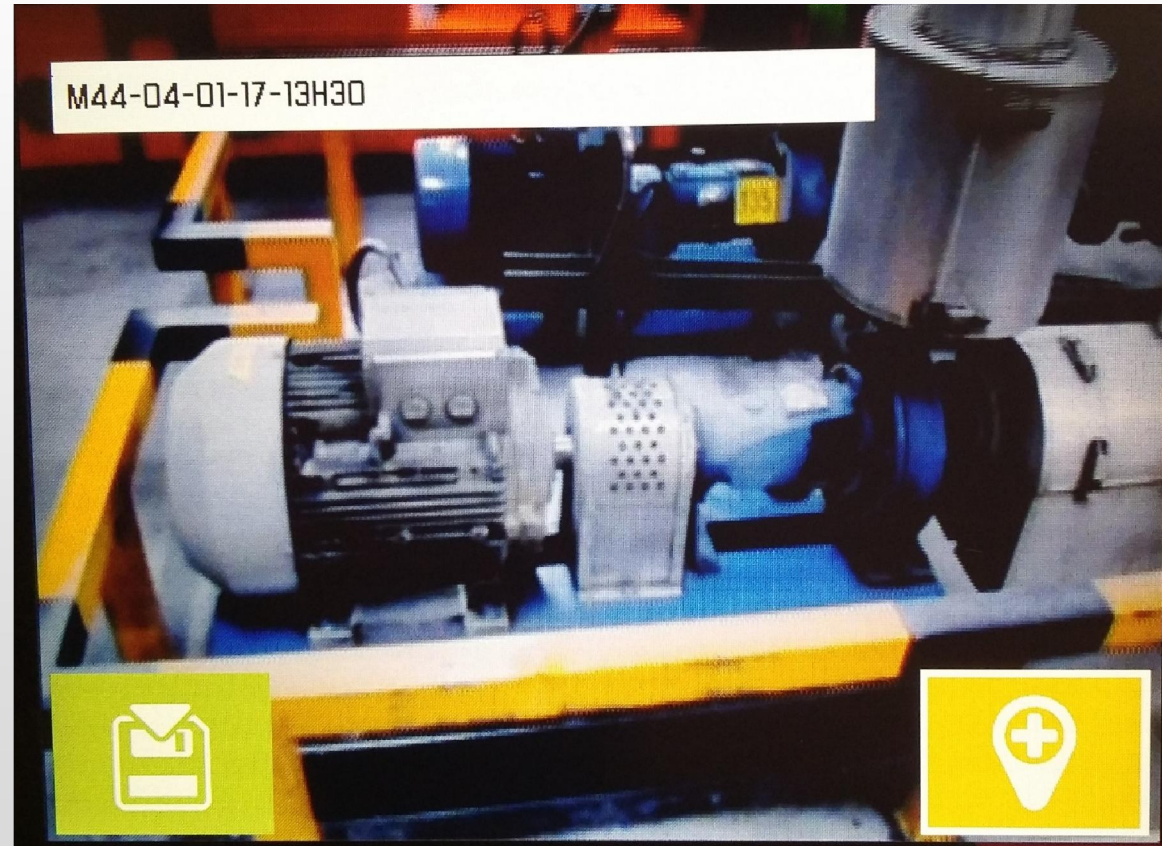
▪ <u>VSHOOTER® - WITH MCP</u>:

➤ **POINT CREATION:**

Click on the yellow icon (13) with **OK**.

You are invited to place the 1rst measurement

point on the photo (*) with the joystick keyboard.

Then, you valid its position with **OK**.

You can put <u>10 measurement</u> points on a MCP.

VSHOOTER® VBS1T – MEASURE WITH MCP

All these icons below can be selected with joystick and validated with OK keyboard buttons.
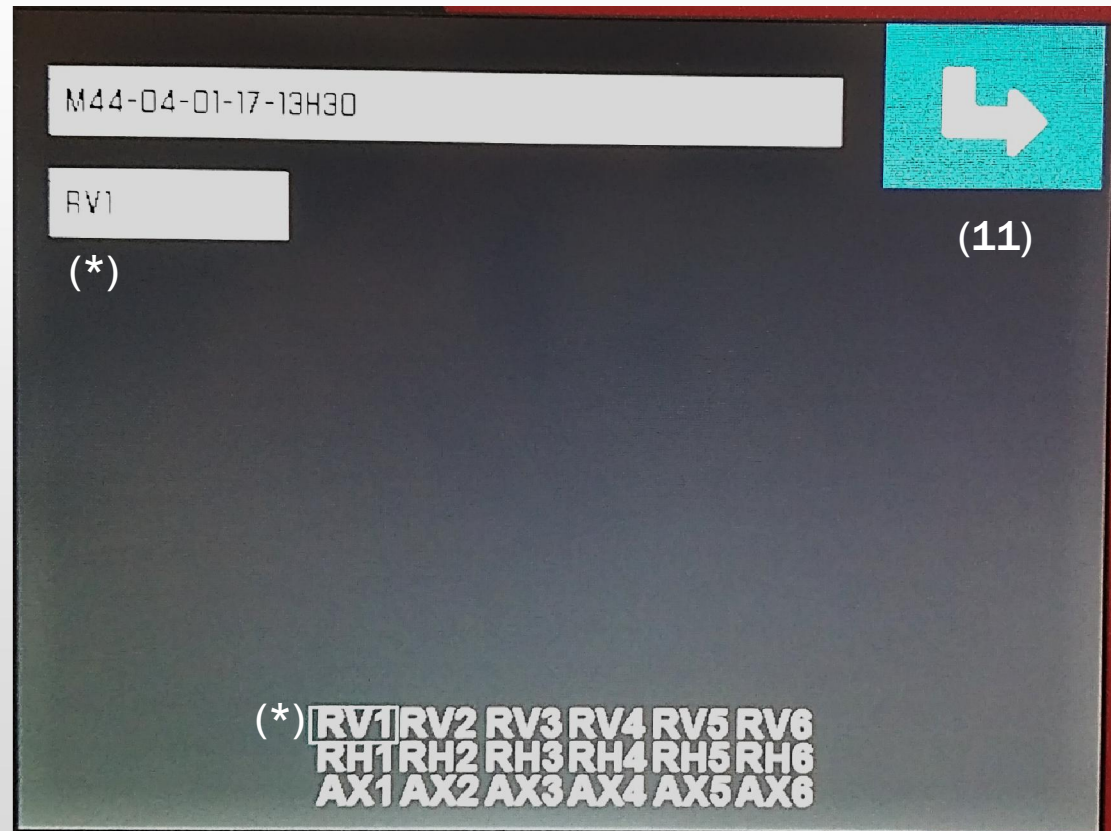
- ## VSHOOTER® - WITH MCP:

➤ **POINT NAME:**

Machine is time stamped. You are invited to

choose a name (*) to your measurement point

with the joystick keyboard.

Valid this name with **OK** *. Then valid by going*

on BLUE icon (11) with **∧** *and* **OK** *.*

*RV for radial vertical, RH for radial horizontal,

AX for axial.

M44-04-01-17-13H30

RV1

(*)

(11)

(*) RV1 RV2 RV3 RV4 RV5 RV6
RH1 RH2 RH3 RH4 RH5 RH6
AX1 AX2 AX3 AX4 AX5 AX6

- **VSHOOTER® - WITH MCP:**

➢ **MEASUREMENT:**

Put your accelerometer sensor on the right place. Fulfill RPM (9) and T°(8)(if needed).

Lets start measurement with START icon (6) (via **OK** *). Then store the result with green SAVE icon with* **OK** *(*).*

In ISO icon (7), you can define ISO class and vibration filter (V-RMS 2 & 10-1000 Hz) and alarms threshold levels. To be done before START if special ISO is needed.

(*) SAVE icon will only appear when the measurement is finished.
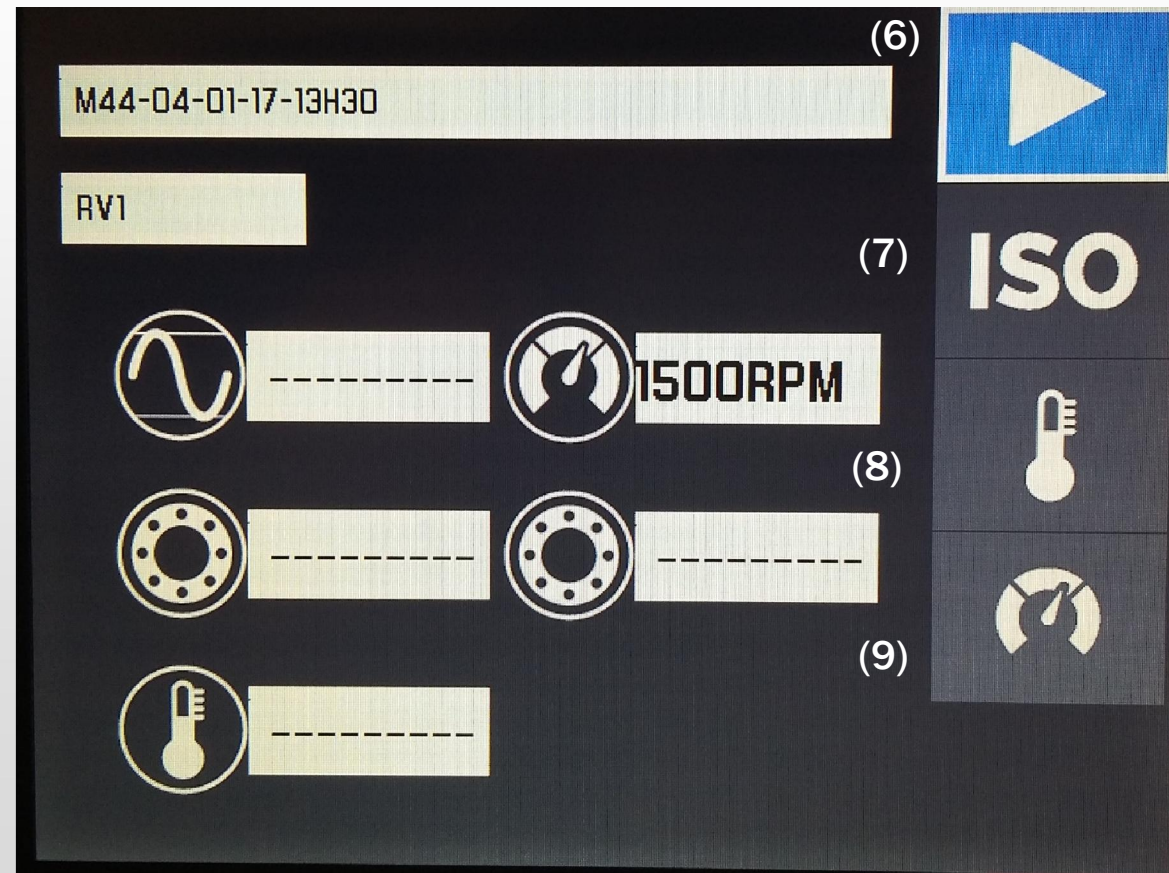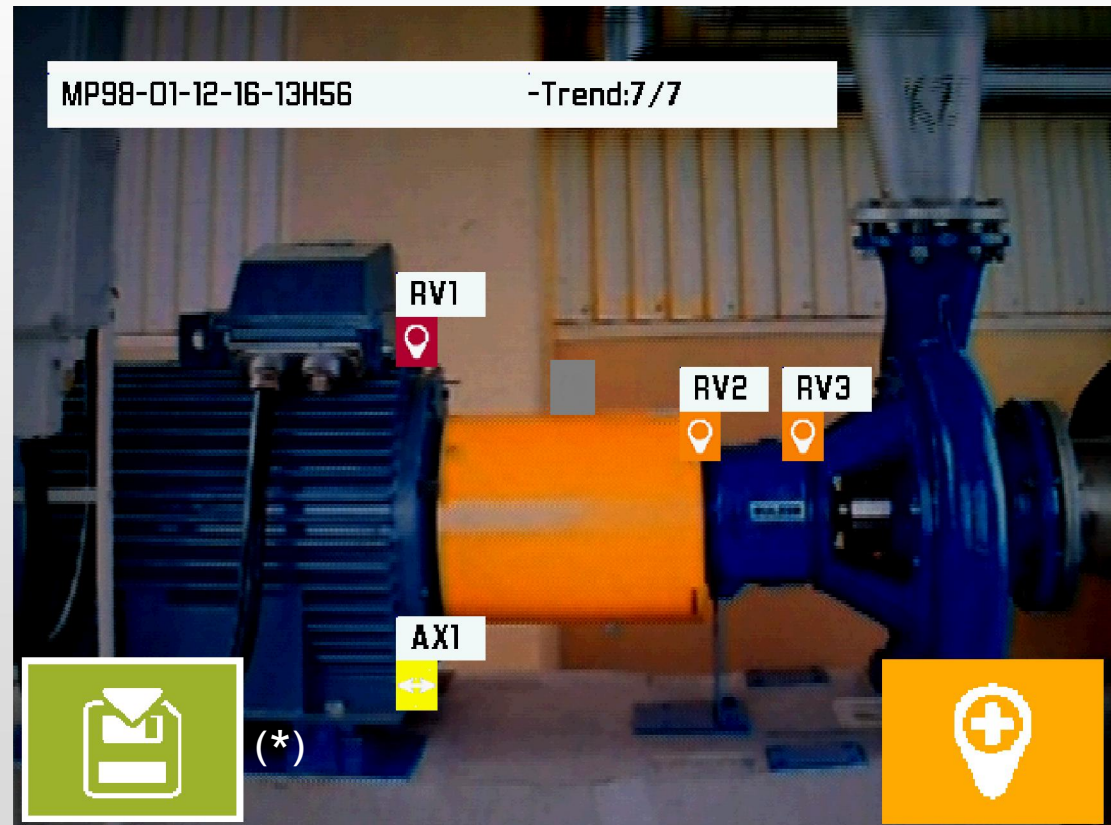

40

- ## VSHOOTER® - WITH MCP:

- ### REPEAT or FINISH:

Repeat the procedure for each point (10 maximum).

RPM will be automatically updated for each point.

When MCP is finished, click with **OK** *on the green SAVE icon (*) to save the MCP in memory.*

CAREFUL!!!: You can not add new measurement point when MCP is finished and saved. Only new measurements can be done (TRENDING) on saved measurement points.

MP98-01-12-16-13H56   -Trend:7/7

RV1

RV2   RV3

AX1

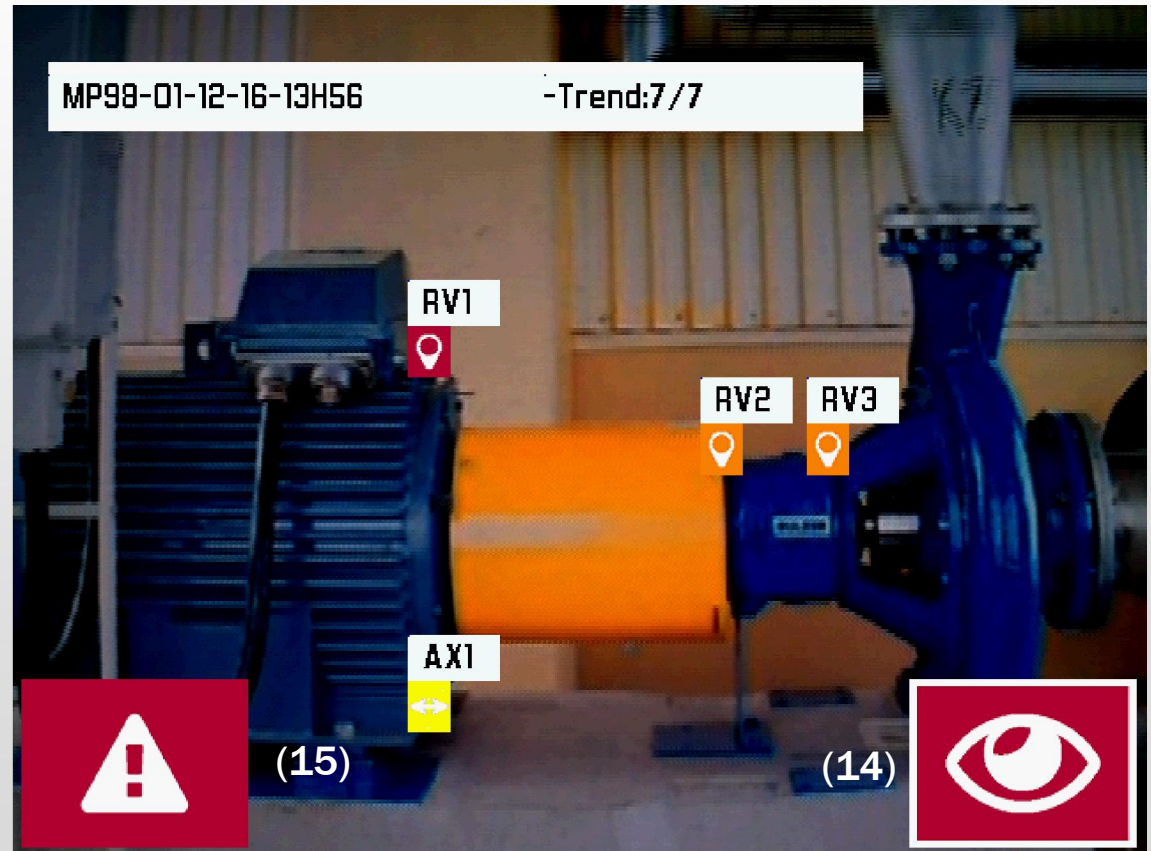(*)

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VSHOOTER® VBS1T – MEASURE WITH MCP

All these icons below can be selected with joystick and validated with OK keyboard buttons.

▪ <u>**VSHOOTER® - WITH MCP:**</u>

➢ **DEFAULTS and DATA:**

Then, you will see the final MCP with 2 icons:

the EYE icon (14) to see results details and the

CAREFUL icon (15) to see defaults details,

calculated from AUTO DIAGNOSE FFT.

Of course, if you want to stop the job on this

machine, you can click on 🏠 *button.*

MP98-01-12-16-13H56   -Trend:7/7

RV1

RV2   RV3

AX1

(15)   (14)
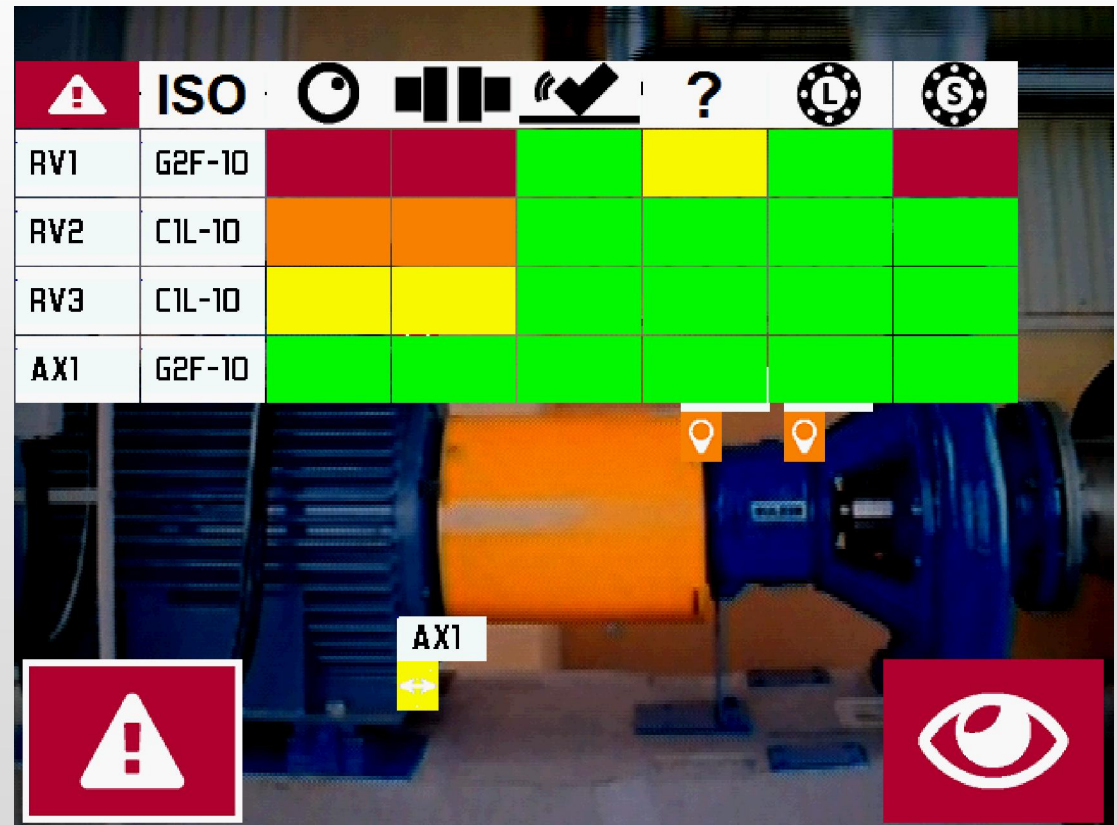
- **VSHOOTER® - WITH MCP:**

> **DEFAULTS DETAIL (max 10 points):**

If you click on the CAREFUL icon (15), you will see

a table with the point names and default details

(Imbalance, Misalignment, Looseness, Other,

Bearing Lubrication, Bearing Shocks, calculated

from AUTO DIAGNOSE FFT).

Alert is orange, Alarm is red.

If you click on the EYE icon (14), you will see all

overall value measurement data.

To go from DIAGNOSE to EYE icon, use **OK**.
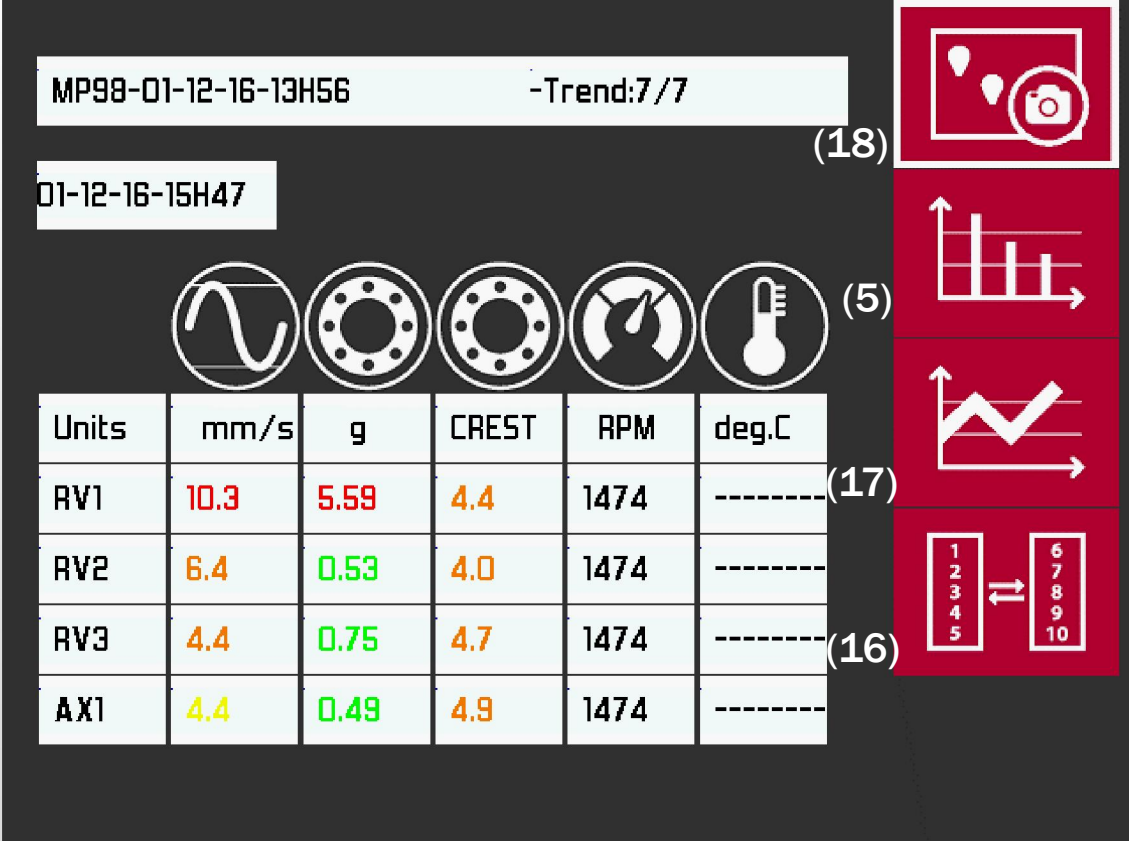
VSHOOTER® - WITH MCP:

➢ **DATA DETAIL:**

With (16) icon and [<] [>] *, alternately,*

you see all points (5 per table, 10 maximum).

If you have "multi date" data, you can also see

trends by clicking on TREND icon (17).

If you need to see AUTO DIAGNOSE FFT for a

measurement point, click on ALARM FFT icon (5).

Go back to the MCP with MCP BACK icon (18).

MP98-01-12-16-13H56   -Trend:7/7

(18)

01-12-16-15H47

(5)

Units	mm/s	g	CREST	RPM	deg.C
RV1	10.3	5.59	4.4	1474	--------
RV2	6.4	0.53	4.0	1474	--------
RV3	4.4	0.75	4.7	1474	--------
AX1	4.4	0.49	4.9	1474	--------

(17)

(16)

44

- **VSHOOTER® - WITH MCP:**
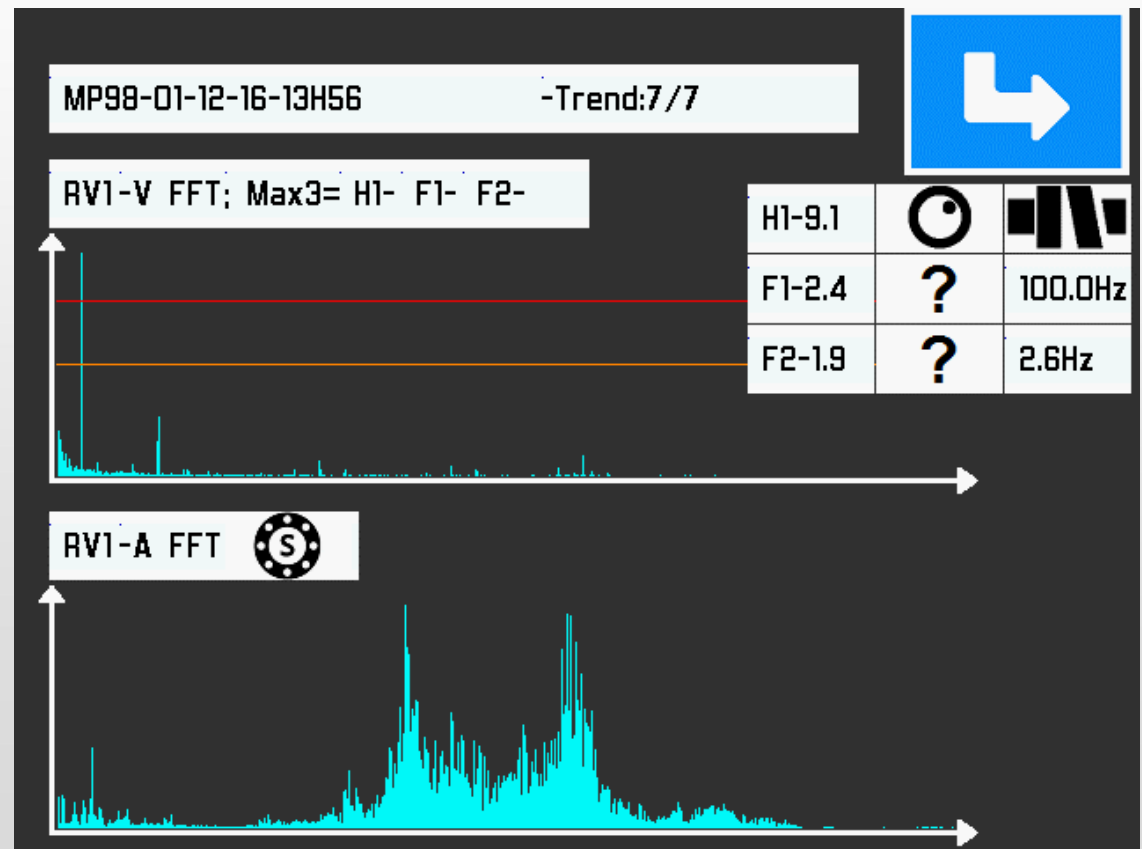
➢ **FFT DATA DETAIL (ICON (5)):**

Do not forget: FFTs are only taken if you have

ALERT (ORANGE) or ALARM (RED) on a point,

for a V-RMS or a A-RMS or for both V&A problems.

Only the last alert/alarm FFT is stored in memory.

2x FFT spectrums are taken: V-Velocity (mm/s)

on 2-500 Hz & A-Acceleration (g) on 2-10000 Hz.

To view all the machine point FFTs, use ◀ *and* ▶ *.*

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VSHOOTER® VBS1T – MEASURE WITH MCP

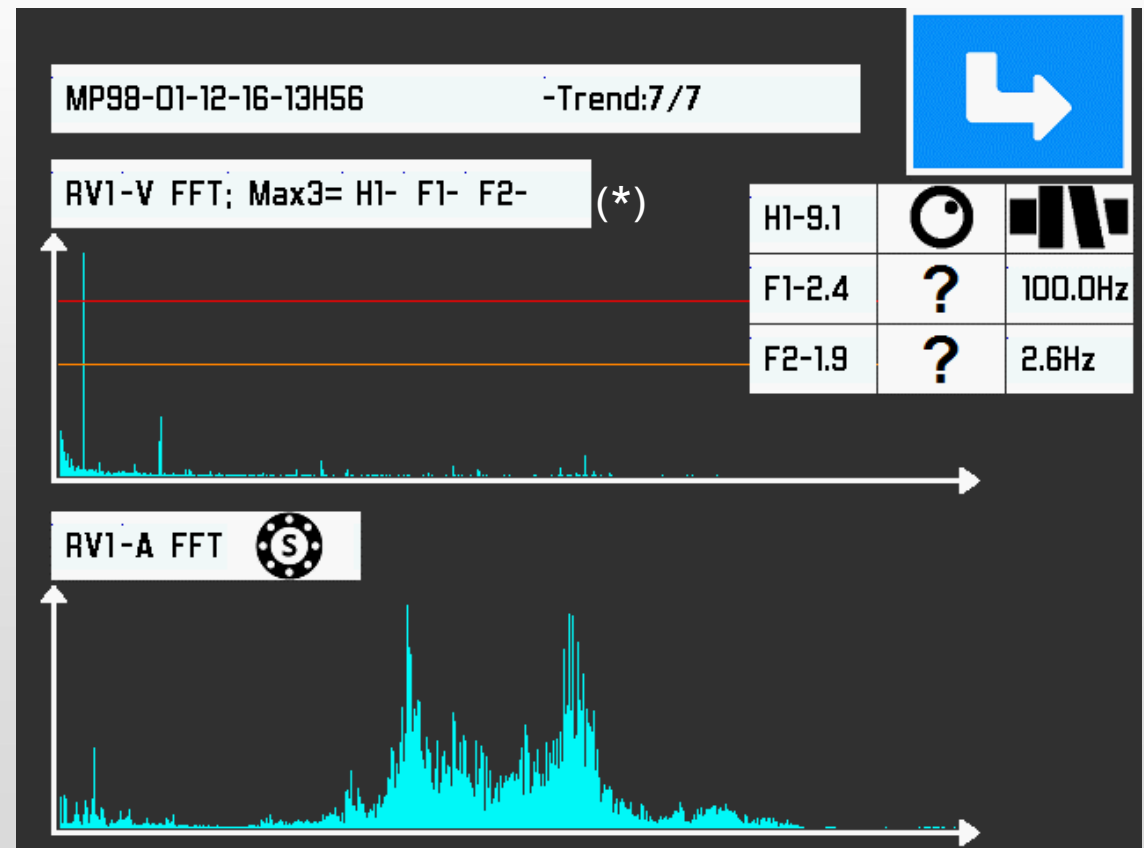**All these icons below can be selected with joystick and validated with OK keyboard buttons.**

VSHOOTER® - WITH MCP:

Max3 DATA DETAIL:

Only the 3 highest amplitude frequencies are presented (Max3) in the V-FFT (*).

These Max3 frequencies can be H1, H2,.....H8 (fundamental H1 or harmonics) or any ordinary F.

Any ordinary (?) will be detailed with F1-F2-F3 (Hz) and their amplitude (mm/s) values.

▪ **VSHOOTER® - DATA AND FFT INFORMATION:**

CAREFUL!:

You can have an overall vibration level V-RMS in ORANGE or RED, but with GREEN or YELLOW standard defaults (imbalance, misalignment, looseness), because the major default may also be different than x1, x2, x3—x8 harmonics...

Of course, in this case, you will see the value of its amplitude and its frequency in the ALARM FFT SPECTRUM information icon (5).

So, a measurement point on the MCP can be ORANGE (RMS-V overall ISO value), with YELLOW Imbalance default for example...

Do not forget RMS-V is calculated on 10-1000 Hz, so several YELLOW defaults can result in a ORANGE RMS-V value...

▪ **VSHOOTER® - HOME PAGE:**

➢ **MEMORY ICON (2):**

Review a stored file or update a stored file

(trending). File deletion is also possible.

You can store around 1000 projects.

Select this icon (19) with ◀ ▶ *and valid it*

with **OK** *.*

(19)

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▪ VSHOOTER® - HOME PAGE:

➤ **MEMORY - DETAIL:**

OK *TO OPEN A SELECTED FILE FOR DATA VIEWING*

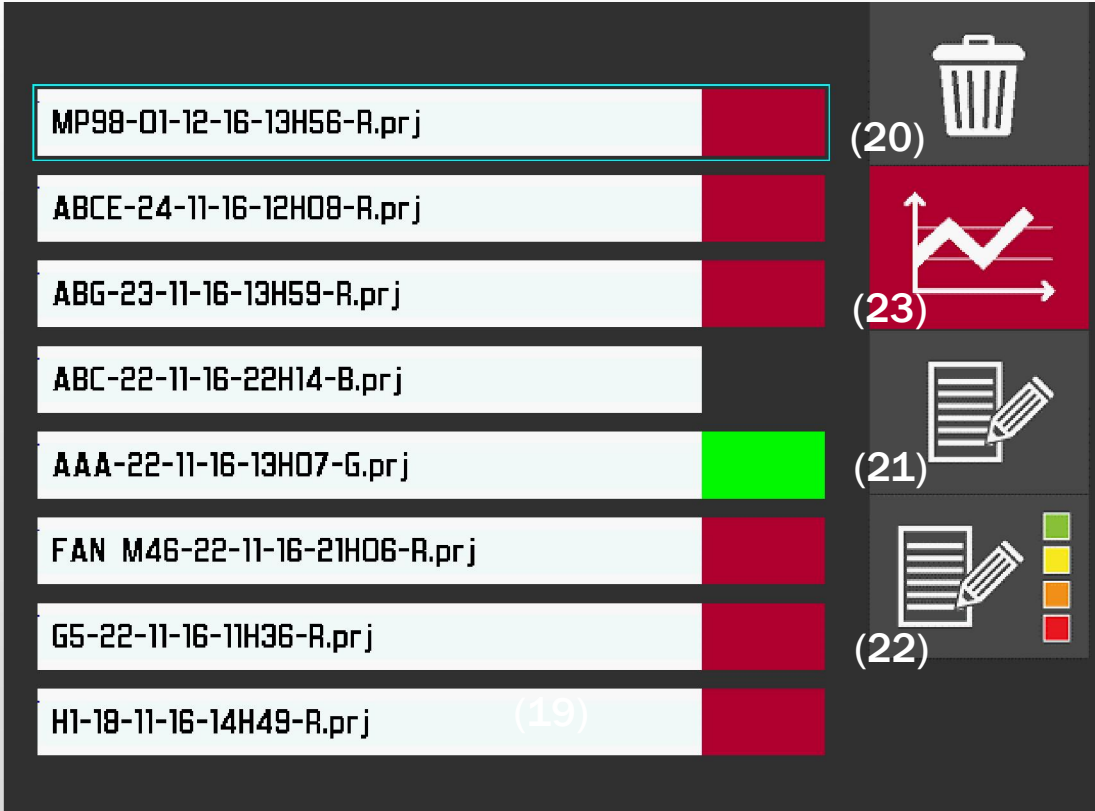*(20) FOR PROJECT FILE DELETION*

(23) TO OPEN A PROJECT FILE FOR TRENDING

(21) FOR REPORT EDITION (for one selected file)

(22) FOR ALARM REPORT EDITION (for all files)

You can select/open DELETION icon (20) or

TREND icon (23) with a preselected file (green)

and **< > OK** *buttons.*


```
MP98-01-12-16-13H56-R.prj        (20)
ABCE-24-11-16-12H08-R.prj
ABG-23-11-16-13H59-R.prj         (23)
ABC-22-11-16-22H14-B.prj
AAA-22-11-16-13H07-G.prj         (21)
FAN M46-22-11-16-21H06-R.prj
G5-22-11-16-11H36-R.prj          (22)
H1-18-11-16-14H49-R.prj    (19)
```
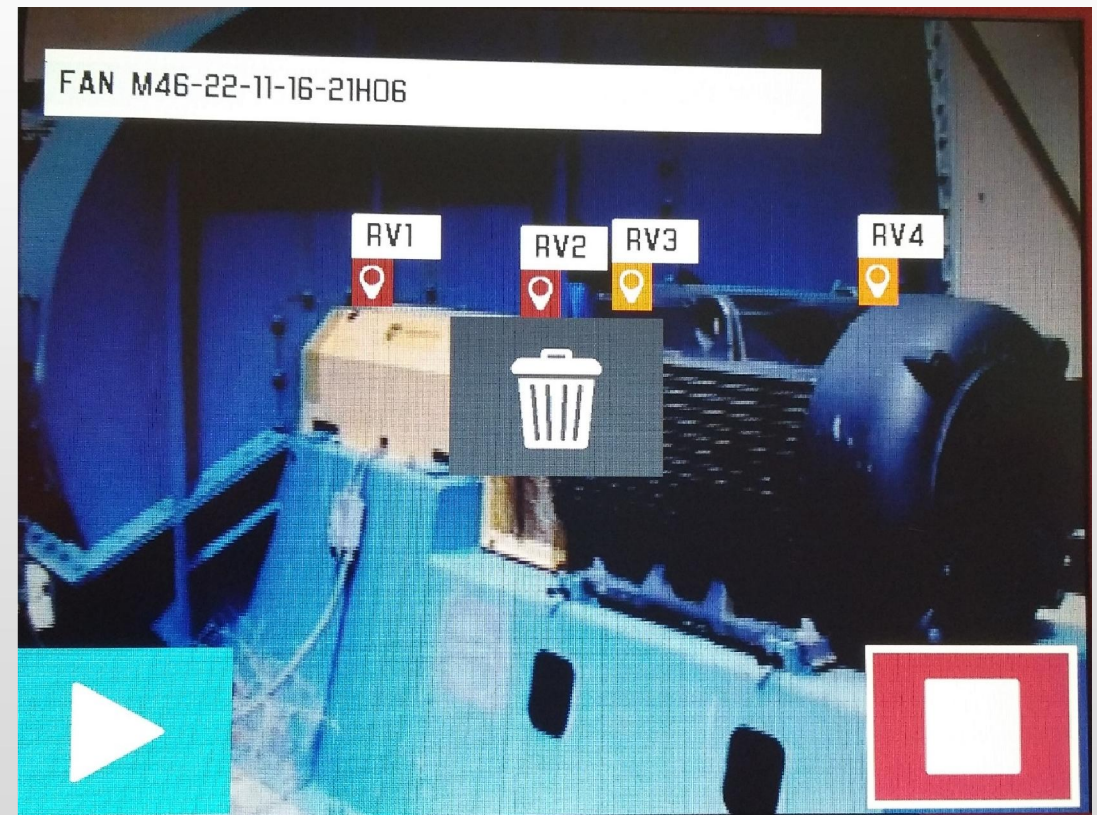
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VSHOOTER® - HOME PAGE:

➢ **MEMORY - DELETION:**

You have selected a file in the list (in green),

you have clicked on DELETION icon (20).

You need to confirm DELETION with

YES (BLUE PLAY icon) or NO (RED STOP icon)

and **OK** *for validation.*

VSHOOTER® VBS1T – MEMORY>TREND VIEW

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- ## VSHOOTER® - HOME PAGE:

- ### MEMORY – TREND VIEW:

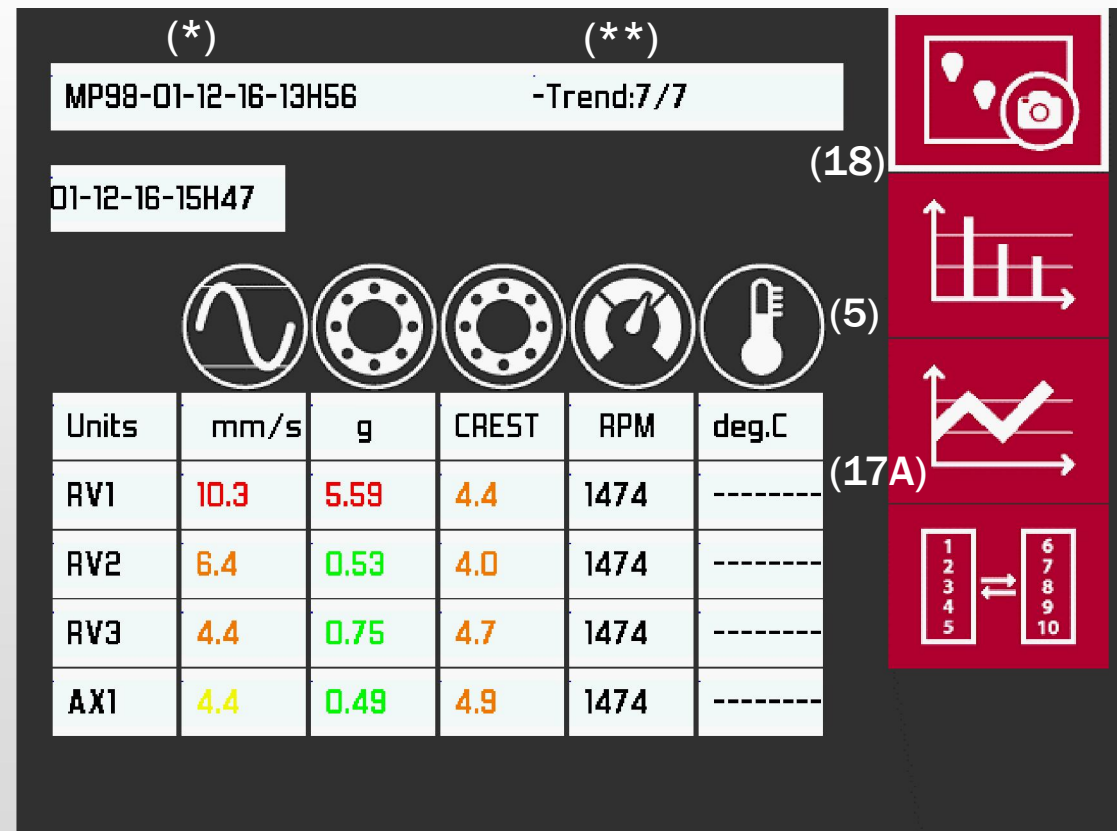*You have selected a file in the list (green),*

you have clicked on **OK** .

(*) is project creation date.

(**) is last point measurement date (7/7).

You can select & view last results of FFT (5) or

TRENDS (17A) with **OK** *for validation.*

You can go back to MCP (18)

Units	mm/s	g	CREST	RPM	deg.C
RV1	10.3	5.59	4.4	1474	--------
RV2	6.4	0.53	4.0	1474	--------
RV3	4.4	0.75	4.7	1474	--------
AX1	4.4	0.49	4.9	1474	--------

MP98-01-12-16-13H56   -Trend:7/7

01-12-16-15H47

(18)
(5)
(17A)

- ## VSHOOTER® - HOME PAGE:

> ## MEMORY – TRENDVIEW – ALL POINTS:

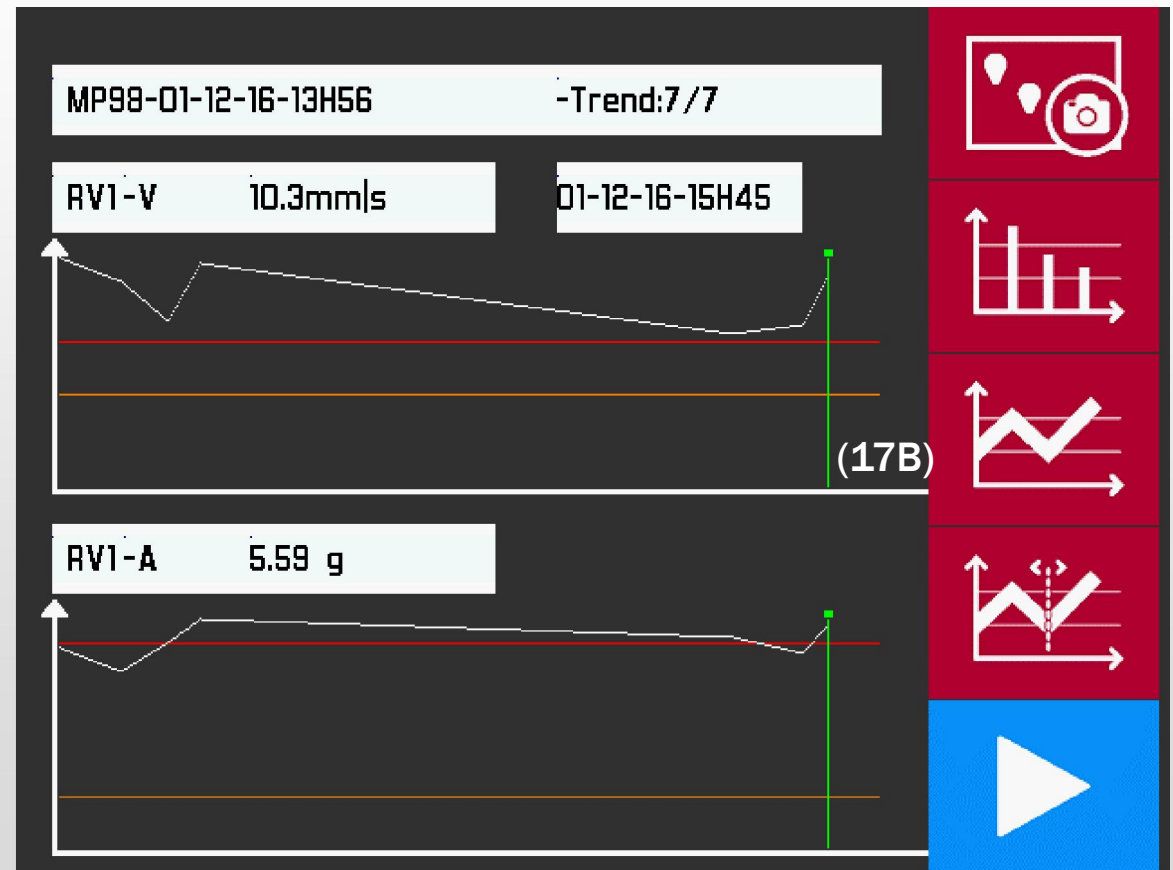*You have clicked on TREND icon (17A).*

If you select again TREND (17B) icon and

, you can view all MCP TRENDS.

Only last date measurement (green line) will be

shown as values.

1 file = V-RMS;A-RMS;A-CREST and T° if taken.

MP98-01-12-16-13H56   -Trend:7/7

RV1-V   10.3mm|s   01-12-16-15H45
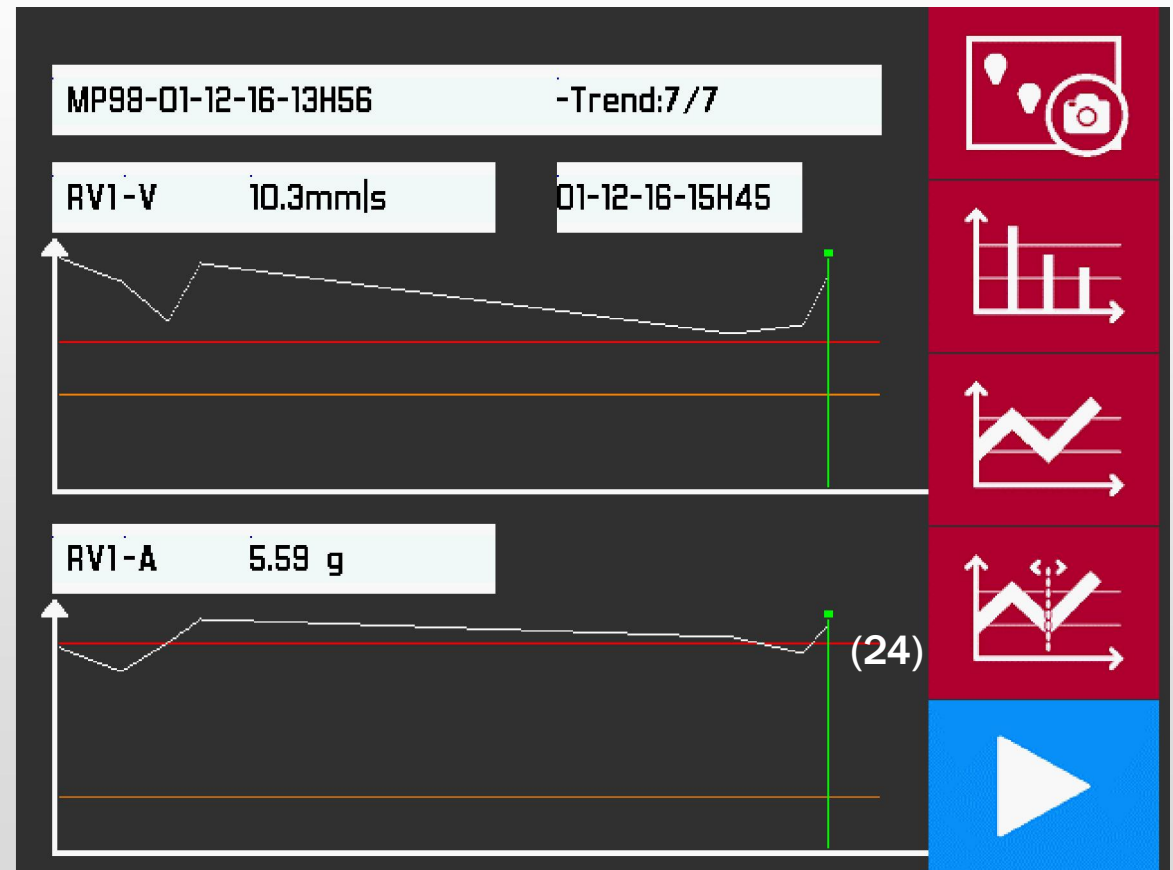
(17B)

RV1-A   5.59 g

▪ **VSHOOTER® - HOME PAGE:**

➢ **MEMORY – TRENDVIEW – ALL IN DETAIL:**

You have clicked on TREND icon (17A).

If you select TREND DETAIL (24) icon and

, you can view details for a selected TREND.

All measurements (green line) will be shown

as values.

▪ VSHOOTER® - HOME PAGE:

➢ **MEMORY – TREND – NEW MEASURE:**

You are ready to start new TRENDING (23) measure.

Now, you have to click on TREND (25) icon to select
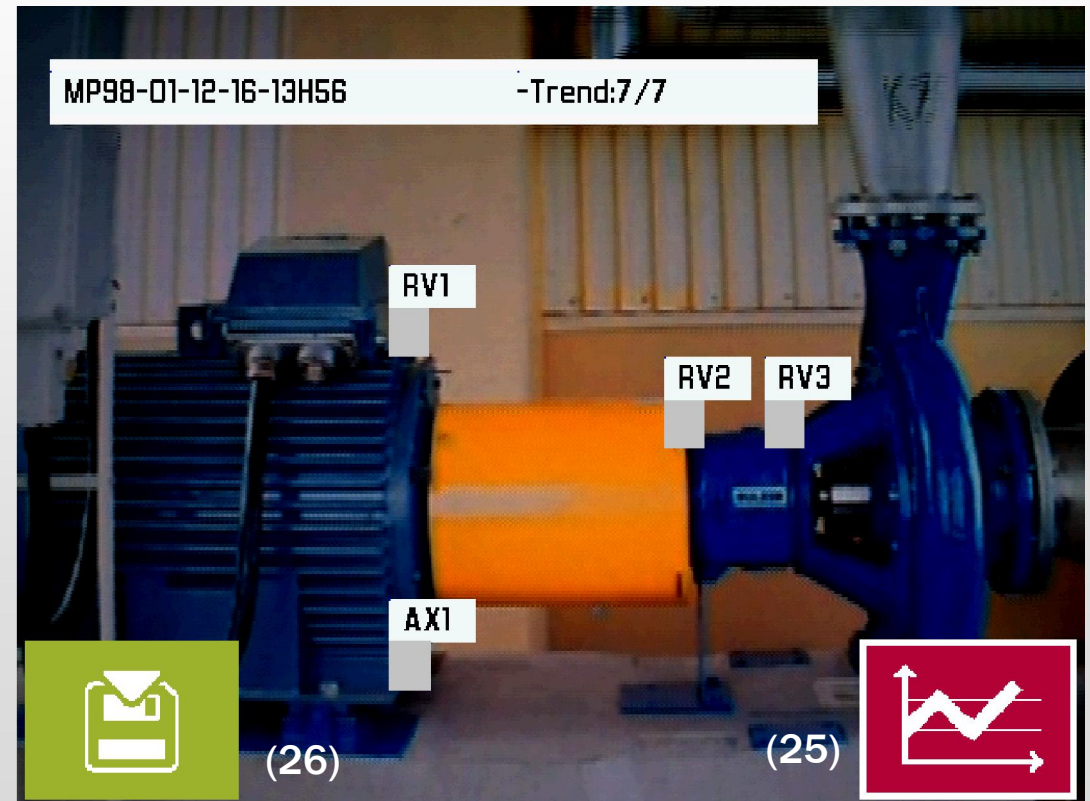
a point (in any order) and start new measurements.

All location points will be firstly grey and will

become colorized when measurement will be done.

At the end, select SAVE (26) icon and valid it with

OK .

TREND curves will be updated in the memory.

MP98-01-12-16-13H56   -Trend:7/7

RV1

RV2   RV3

AX1

(26)   (25)

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VSHOOTER® VBS1T - SETTINGS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

- ## VSHOOTER® - HOME PAGE:

> ### SETTINGS ICON:

You can access here to all VBS1T settings.

Select this icon (27) with ◀ ▶ *and valid it with* **OK** *.*

VSHOOTER® VBS1T - SETTINGS

All these icons below can be selected with joystick and validated with OK keyboard buttons.

VSHOOTER® - HOME PAGE:

SETTINGS - DETAIL:

(28) Setting of sensor SENSITIVITY (please

do not change it! For calibration check)

(29) USB MODE for PC connection

(30) Screen BRIGHTNESS

(31) CLOCK/DATE

(32) UNITS (mm-°C or inch-°F)

(33) HEADPHONES LEVEL

- ## VSHOOTER® - HOME PAGE:

> ### SETTINGS – USB PC CONNECTION:

Connect VSHOOTER to your PC via USB.

Click on PC USB MODE (29) icon and wait WINDOWS connection.

It can take some seconds depending of WINDOWS version. If VSHOOTER reboot, please do it again.

After data/report PC download, disconnect your USB cable from your PC, VSHOOTER will reboot automatically after some seconds.

VSHOOTER® VBS1T - SETTINGS

All these icons below can be selected with joystick and validated with OK keyboard buttons.
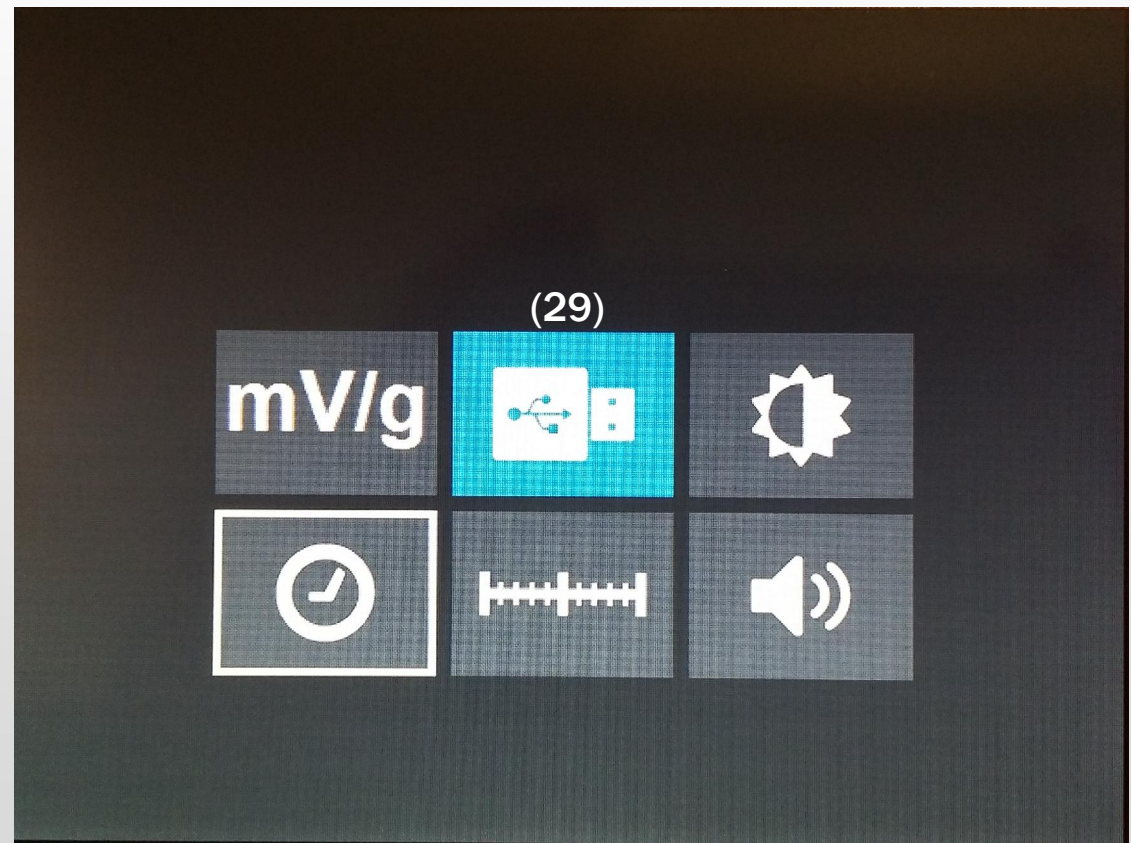
▪ VSHOOTER® - HOME PAGE:

➢ **SETTINGS – REPORTING ON PC:**

Do not forget to transform your Project file (.prj) into Report file (.rpt) with *before downloading the report to your PC.*

If your USB connection is OK, you can view all your data on your PC.

Copy & Paste the .rpt files you want to print or save (REPORT directory). You can view each report by clicking on the .html (you can also edit it in WORD, if you want to modify or personalize the report).

You can also save your .prj for data security saving (PROJECT directory).

Report files are named: xxx.rpt (Reports) and Alarmlist.rpt

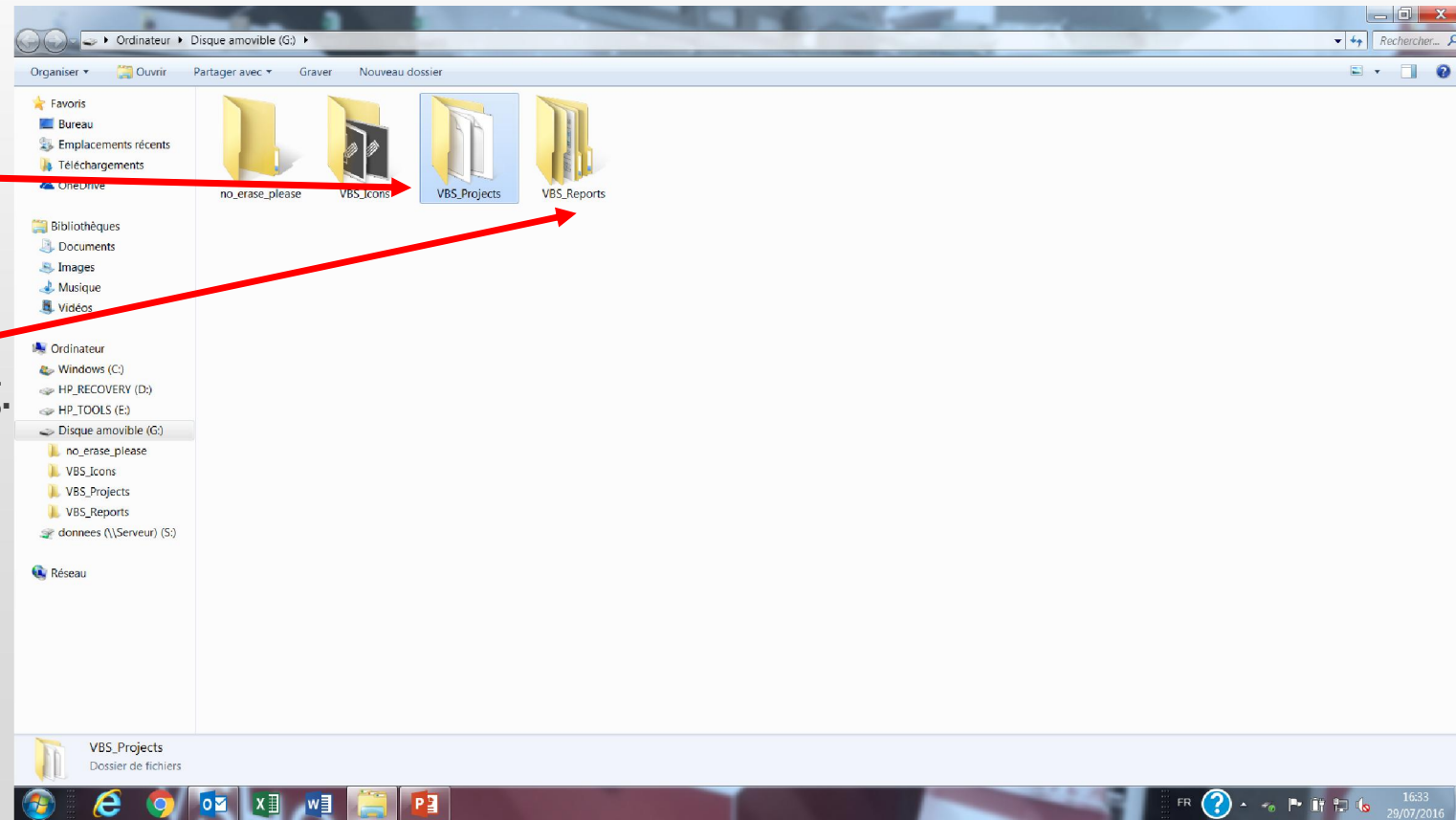*Original project data files are named : xxx.prj (Projects).*

VSHOOTER® - HOME PAGE:

➤ SETTINGS – REPORTING ON PC:

VBS Projects are your data,

you can make a copy for security.

VBS Reports are your reports,

you can make a copy for reporting.

You can copy/paste them to your

PC for data and report saving.

VSHOOTER® VBS1T - SETTINGS

- <u>**VSHOOTER® - HOME PAGE:**</u>

➢ **SETTINGS – REPORTING ON PC:**

CAREFUL!!! ON VSHOOTER USB MEMORY :

Do not touch/delete "no_erase_please" directory.

Do not touch/delete "VBS_Icons" directory.

*Only copy <u>or</u> delete VBS_Projects and VBS_Reports files or directories.*

▪ VIBRATION ANALYSIS:

*Predictive maintenance with vibration measurements for rotating machine can be taken following measurements:*

- *Velocity (mm/s) for Free Body Vibration detection like Unbalance, Misalignment, Looseness, Resonance....*
  - *We use for that, low frequency filters like 2 or 10 -1000 Hz (ISO 10816)*

- *Acceleration (g) for shock/friction detection like in Bearing, Cavitation,...*
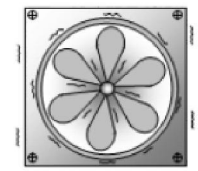 - *We use for that, high frequency filters like 1000-10000 Hz*
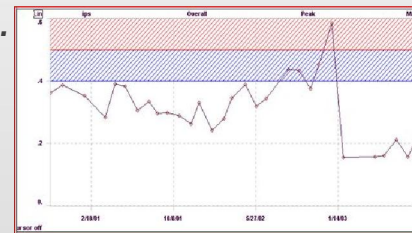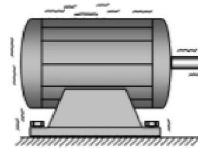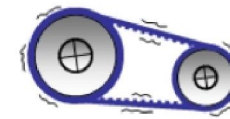
We can follow machine condition in time with LEVEL 1 measurements (TRENDING-OVERALL VALUES).

When LEVEL1 measurements are excessive, you can analyze machine condition with LEVEL 2 measurements (FFT SPECTRUM or else).

75% of vibration problems on standard machineries are coming from Unbalance, Misalignment, Looseness and Bearing condition.
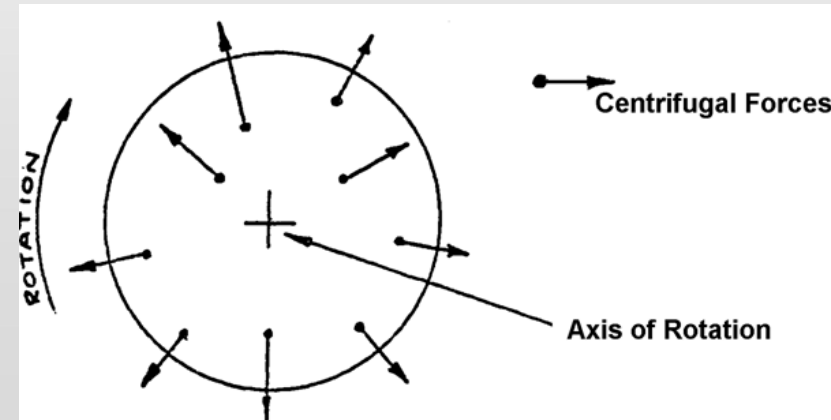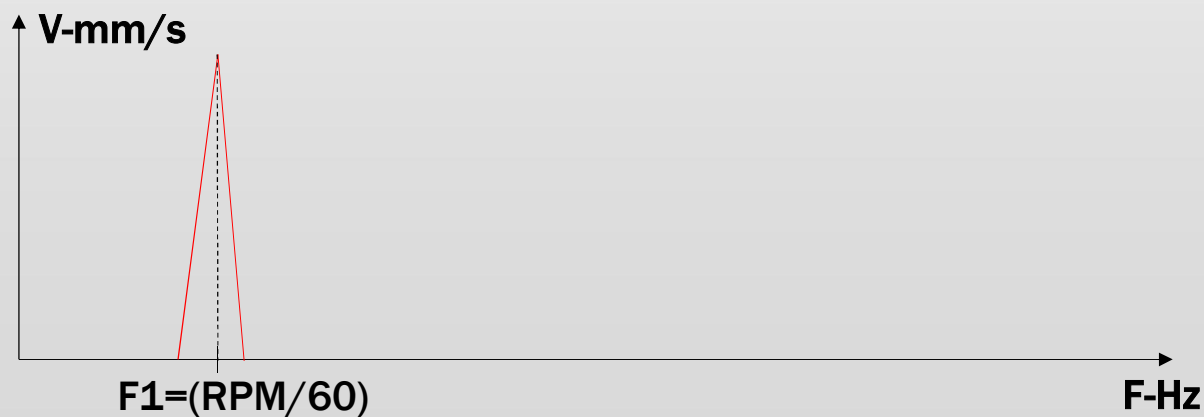
- **UNBALANCE:**

A rotor is unbalanced when the mass center is different than the rotation center.

Unbalance is the most common cause of rotating shaft failure or mechanical breakdown.

It appears in <u>radial direction</u> and it is often dominant in horizontal plan.

Value of Unbalance vibration frequency is at x1 (RPM/60), also called Fundamental.

▪ MISALIGNMENT:

Misalignment is a combination of horizontal and vertical Offset and Angular gaps you can have between 2 machine rotation axes.

Misalignment creates large forces to the bearings.

It appears in radial direction (OFFSET at x2 RPM) and in axial direction (ANGULAR at x1 RPM).

Values of Misalignment vibration frequencies are at x1 (RPM/60), also called Fundamental and at x2 (RPM/60) called Harmonic 2.

V-mm/s
Angular in axial
Offset in radial

F1=(RPM/60)   F2=2x(RPM/60)   F-Hz
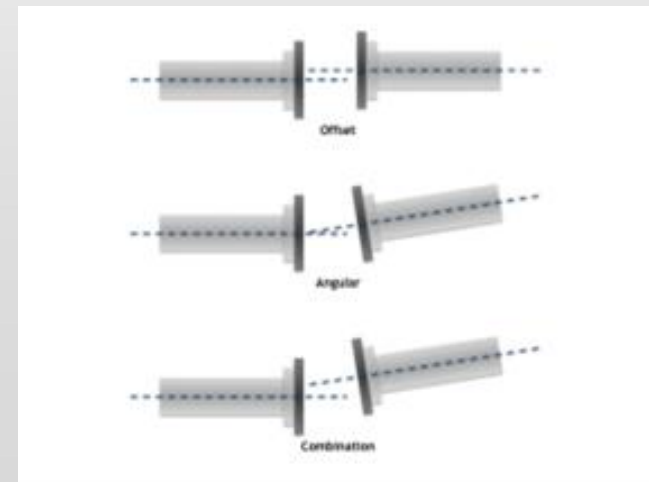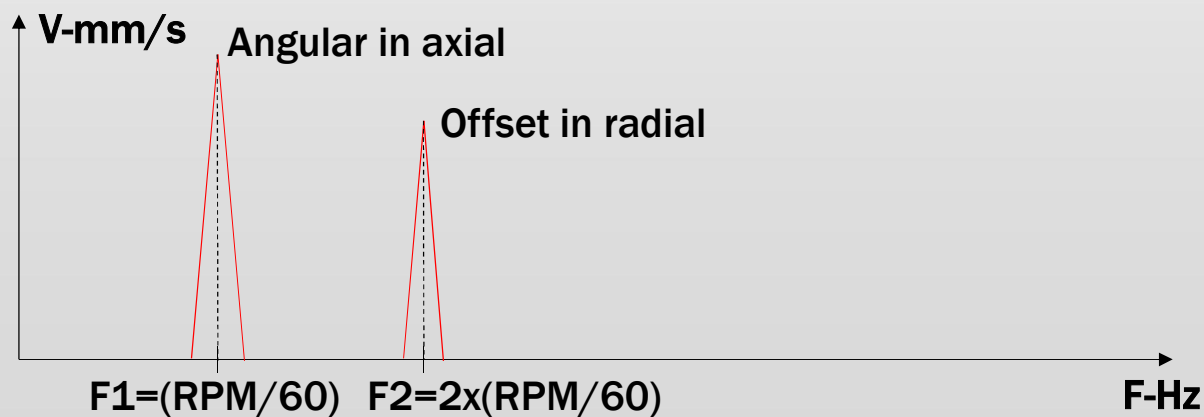
▪ <u>LOOSENESS</u>:

Looseness is coming from a mechanical loose foot, a foundation fixation problem, when rotation components do not fit correctly.

Looseness can create large vibration on all machine. Check on bearing and on fixation.

It appears in <u>radial direction</u> with a special high level of harmonics frequencies (x2x3x4x5x6x7x8...)

Values of Looseness vibration frequencies are at x1 (RPM/60), 2x (RPM/60), 3x (RPM/60),...
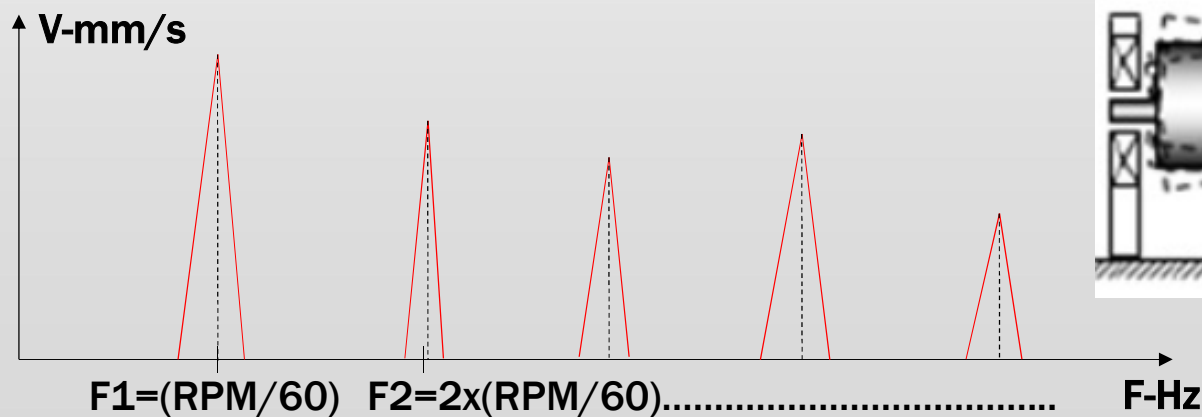
- **BEARING CONDITION (shock and lubrication):**

Bearing condition can be measured on a rotating machine with overall acceleration value (A-RMS in g).

RMS value with a high frequency filter (ex: 1000-10000 Hz) will give a global condition of it.

0-PEAK or CREST values can help to check if there is more lubrication or shocks problems in it.

For bearing condition, we will only follow the LEVEL1 (TRENDING) in RMS and CREST.

T° trending curve can also help you to take a decision before to repair.

For a good bearing analysis, please be careful about your contact point quality.