



USER

GUIDE

LKS
1000
V3+
PRO



Your Complete Source for
Testing Equipment Since 1969!

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SUMMARY

PACK LKS1000 V3+PRO	3	K, WITHOUT SETTINGS	13
WHAT IS LEAKSHOOTER® ?	4	K, WITH SETTINGS	13
HOW TO WORK WITH LEAKSHOOTER® ?	4	THERMAL CAMERA (V3+PRO) – HOW IT WORKS?	14
DETAIL OF LEAKSHOOTER®	6	STRAPSHOOTER+® (V3+PRO) – HOW IT WORKS?	16
DETAIL OF KEYBOARD	7	STRAPSHOOTER+® (V3+ PRO) – REAL TIME	17
DETAIL OF SCREEN	8	STRAPSHOOTER+® (V3+ PRO) – AUTO	18
BATTERY CHARGING	9	MAIN ICONS USED IN LEAKSHOOTER®	20
ON / OFF	9	ACCESSORIES LEAKSHOOTER® DETAIL	22
MAIN MENU	10		
K, HOW IT WORKS?	12		
K, CONDITION OF USE	12		



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WHAT IS A LEAKSHOOTER®?

LEAKSHOOTER® LKS1000 V3+PRO is a portable detection device that helps **locate, hear, view, measure and record leaks which emit ultrasounds**. It can estimate the leak flow and the leak cost for each leak.

It has also a special expert program STRAPSHOOTER+® dedicated to STEAM TRAP condition analysis and an embedded 160x120 pixels thermal imaging camera.

Main industrial applications are:

- ✓ Compressed air leak detection
- ✓ Compressed process gases leak detection
- ✓ Vacuum leak detection
- ✓ Steam trap or valve condition analysis
- ✓ High voltage capacitive default detection (corona, arcing, tracking...)
- ✓ Tightness checking and seal integrity test (with ultrasonic emitter)

HOW TO WORK WITH LEAKSHOOTER®?

LEAKSHOOTER® LKS1000 has been designed to display in real time the fusion of images of the scene being scanned and the detected ultrasounds coming from a leak (ultrasound received = white or colored dynamic target).

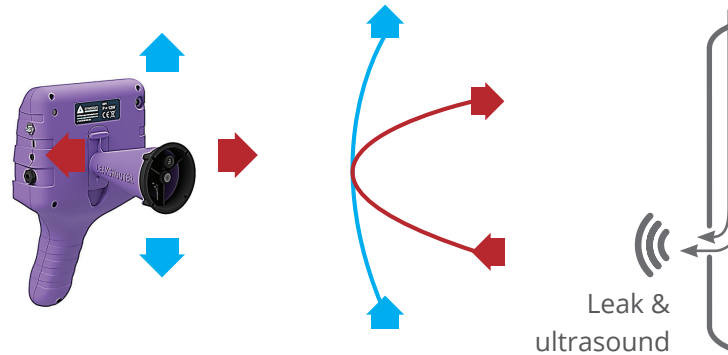
Depending on the leak size (intensity of ultrasonic waves received around 40 kHz) and on the settled sensitivity (GAIN), the dynamic target will be big or small (white).

Of course if you want to know the leak severity, please click on the K function button. The target will then have a severity color (LEAKSCORE from 0 to 100 is made for a 1 meter distance detection).

LEAKSHOOTER® LKS1000 is equipped with a special MAX RMS value function which thanks to the target, shows you if you are close to the leak (simple round target) or in front of the leak (round target + cross in its center).



The method consists of scanning the scene, conscientiously. From far to close location. Do not forget to decrease GAIN slowly to avoid saturation.



Start with the maximum of sensitivity (GAIN=106 dB, settled when the device is switched ON).

Sweep the scene for example from left to right and from top to bottom, with the aim of going in front of the leak and thus activating the special MAX value, which will remain frozen a few seconds (bold vertical line in the bargraph).

If you still have the white target with cross, everywhere,

it is because you are in a saturated zone. Look on the ground with LEAK**SHOOTER**®, slightly decrease the GAIN to be in the green part of the bargraph and scan again in such a way as to find a direction in which to go.

Thus, go back to the area to find this special MAX value (align RMS real time and MAX). You will see a cross in the center of the dynamic target. You are in front of the leak.



DETAIL OF A LEAKSHOOTER®



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DETAIL OF A LEAKSHOOTER®



DETAIL OF KEYBOARD

With LEAKSHOOTER® LKS1000 V3+PRO Keyboard

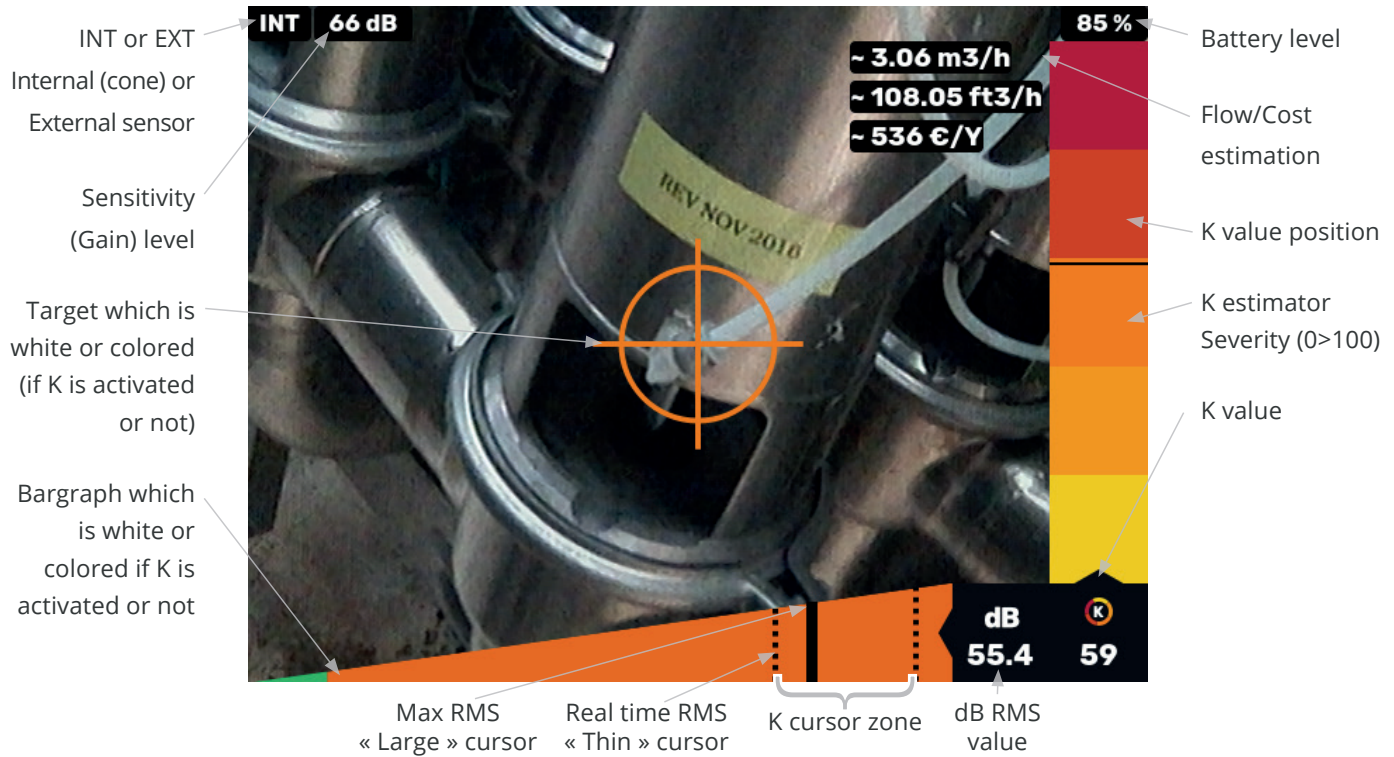


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DETAIL OF SCREEN



BATTERY CHARGING

LEAKSHOOTER® LKS1000 V3+PRO have an internal NiMH (Nickel Metal Hybrid) battery pack technology (6x 1,2V-2600 mAh). To charge this battery pack, please only do it with the delivered charger DC 12V-1,5A.



Maximum recommended charging time is about 2H30. Do not leave your device unattended.

Please be careful not to charge several times (connect - disconnect - connect...) within a few hours. It could disturb the automatic ending charge detection.

Feeling some heat at the end of the charging process is normal.

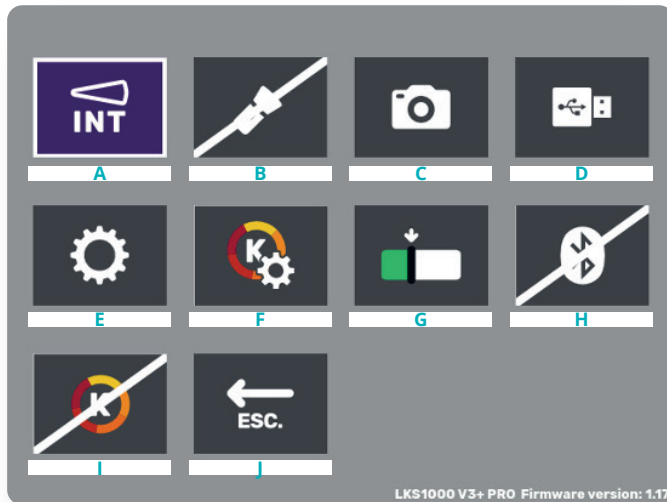
Note: If you want to store your LEAKSHOOTER® during a long time without using it, **please charge it to its 100% capacity before!** Then you will be able to use it after several months without any problem.

ON/OFF

- Switching ON:
Briefly press the button , LEAKSHOOTER® starts 5 seconds after initialization.
- Switching OFF:
Press for a longer time (> 3 seconds) the button , LEAKSHOOTER® goes to switch OFF.





MAIN MENU (VIA OK BUTTON)




- A.** INT (cone) or EXT (flexible or contact) sensor
- B.** LED light activation
- C.** Memory with leakage photos
- D.** USB LINK activation
- E.** General settings
- F.** K (Severity and Estimator of leak flow/cost) settings
- G.** Limit of green/white part of bargraph adjustment
- H.** Bluetooth activation
- I.** Activation of K function
- J.** Escape icon



- A.** It confirms the used sensor between cone (INT) or flexible/contact (EXT).
- When you connect an external sensor, it is automatically detected as EXT (same when removing it).
- B.** To help you to have a better light to take a picture in a dark situation.
- C.** To be able to review stored leakage photos (READ or CANCEL).
- You can navigate with **+** or **-** buttons and escape with **OK**.
- To cancel a photo, click on the PHOTO button .
- D.** To download photos to PC or to update device.
- Connect your device (ON) to PC with USB cable, activate USB LINK and wait with WINDOWS function.
- Copy / Paste / Delete your photos. Before disconnecting, be sure to eject USB with WINDOWS function.
- E.** To set clock/date, luminosity (5 per default), Auto off, frequency mixing (42 kHz per default).
- F.** K (Severity and Estimator of leak flow/cost) settings.
- If you need a flow/cost estimation, please fulfill h/Y compressor use and Nm³ cost. To do that, click on the icon and go to the virtual keyboard with . Choose your number and valid it with the virtual keyboard Enter button.
- G.** Limit of green/white part of bargraph adjustment.
- Select this icon and add +0,5 or +1 or +1,5 dB to your cursor with **+** or **-** button, to make it more closed to white part than green part of bargraph when you do not have ultrasounds. It will help for small leak detection (target will be more reactive to small ultrasounds). Valid value with **OK**.
- H.** Bluetooth activation
- Select this icon and put your headphones or your speaker in pairing mode. Wait some seconds and it' will be OK.
- I.** Activation of K function (leak severity or estimation)
- J.** Escape icon to go back to measure mode.

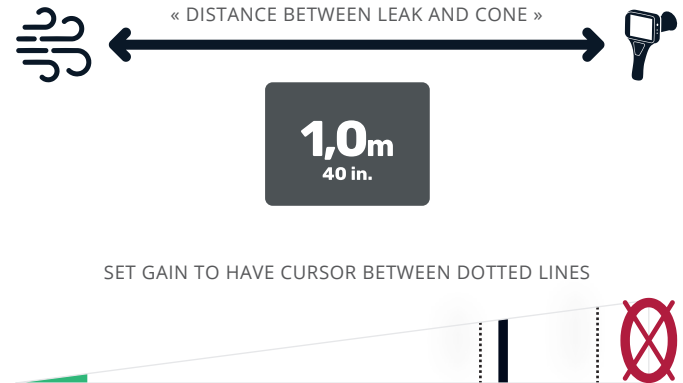


K, HOW IT WORKS?

To activate K function , please select it in general MENU. You can activate or deactivate it according your need.

K, CONDITION OF USE

Only for industrial compressed air (5 to 8 Bar (72 to 116 Psi)).



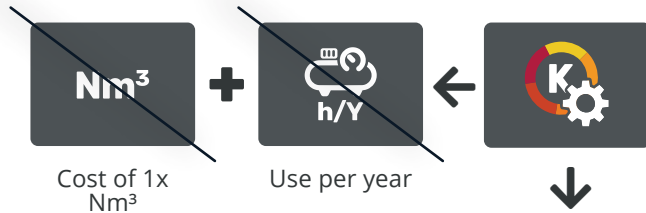
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K, WITHOUT SETTINGS

IF IN K MENU, SETTINGS ARE = « 0 »



LEAKSCORE NUMBER:

0 to 100, from very small to very big leakage

5 colored levels:

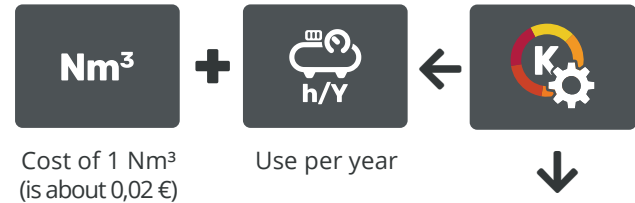
- 0-20 ;
- 20-40 ;
- 40-60 ;
- 60-80 ;
- 80-100

(for about :

- 0.2 m^3/h ;
- 0.6 m^3/h ;
- 3.5 m^3/h ;
- 14.5 m^3/h ;
- 31.7 m^3/h)

K, WITH SETTINGS

IF IN K MENU, SETTINGS ARE BOTH
DIFFERENT THAN « 0 »



LEAKSCORE NUMBER:

0 to 100, from very small to very big leakage

5 colored levels:

- 0-20 ;
- 20-40 ;
- 40-60 ;
- 60-80 ;
- 80-100

+ Flow m^3/h

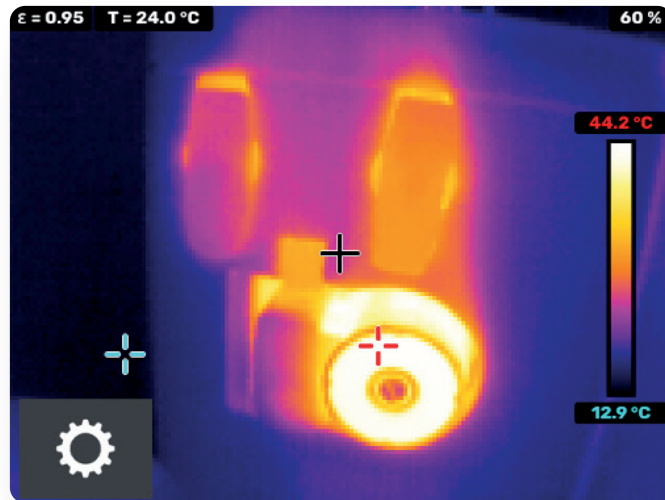
+ Cost/year estimations








THERMAL CAMERA (V3+PRO) HOW IT WORKS?



Out of STRAPSHOOTER+® program



- (-10°C to +400°C range) with AUTO thermal imaging mode
- ϵ can be adjusted with  and  buttons
- Photo can be taken with 2x clicks on the PHOTO button  and a name validated with Enter button on the virtual keyboard
- To go back in ultrasound measurement mode, click on  keyboard button.
- Red cursor and blue cursor values are on the high and low parts of the right vertical colored bargraph. You can access to general settings of IR camera under .



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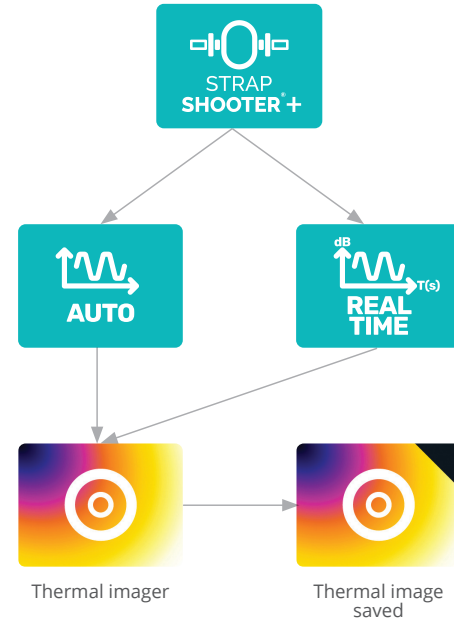
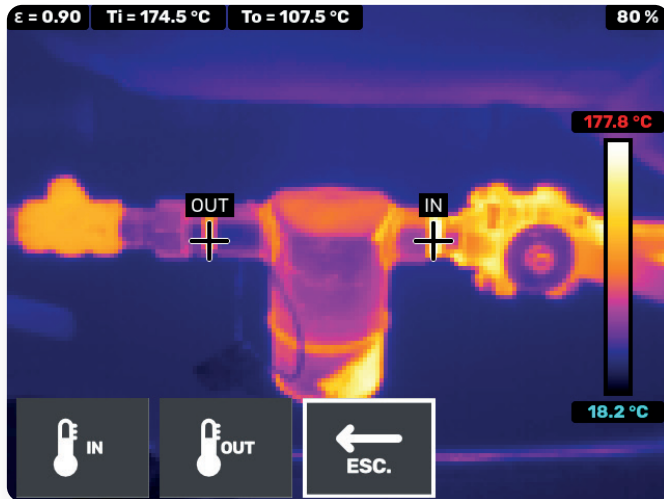
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THERMAL CAMERA (V3+PRO) HOW IT WORKS?



In STRAPSHOOTER+® program






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In STRAPSHOOTER+® **REAL TIME** or **AUTO** mode, select THERMAL icon and wait some seconds to have a stable thermal image (wait after first shutter activation):

- Take/freeze your trap thermal picture with the PHOTO button .
- Select T° IN icon and valid it with **OK** to place the T° IN cursor with joystick keyboard. Valid it with **OK**.
- Select T° OUT icon and valid it with **OK** to place the T° IN cursor with joystick keyboard. Valid it with **OK**.
- Now you can save thermal image if necessary with the Escape icon . Confirm or not.
- You can continue with your ultrasonic measurements.
- Do not forget to save all of your data at the end with the SAVE icon  to take your STEAM TRAP photo and give it a name before final storage in memory (with Enter button on the virtual keyboard).

STRAPSHOOTER+® (V3+PRO) HOW IT WORKS?

STRAPSHOOTER+® is made for a combination of ultrasonic and temperature measurements.

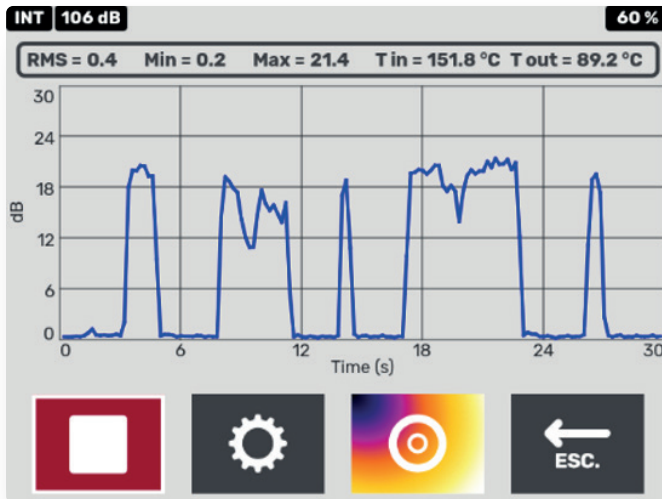
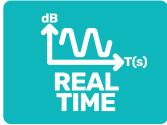
From main MENU, click on the STRAPSHOOTER+® keyboard button  :


- Choose between **AUTO** or **REAL TIME** modes.

Note: For mechanical ball float trap, you need to find modulation in ultrasounds or sometimes cycles. For thermodynamic or thermostatic, you will probably find cycles. If you have a low level and constant, it is probably a closed situation and if you have a high level and constant, it is probably an open leaking situation.



STRAPSHOOTER+[®] (V3+PRO) – REAL TIME



- Click on **REAL TIME** icon.
- Put your probe in contact with your trap.
- Click on **START**, choose your time period with **OK** button, wait some seconds and look at your curve.
- If necessary, adapt **GAIN** and **SCALE** (settings) for high level of ultrasounds (avoid saturation).
- Wait about **STOP following chosen time period**.
- Measure **T° IN** and **T° OUT** with thermal camera and save results (SAVE icon ).
- You can save all data following instructions on screen.

Note: Blue curve is the REAL TIME ultrasonic noise in the trap.







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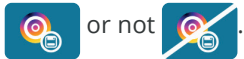
STRAPSHOOTER+[®] (V3+PRO) – AUTO

The STRAPSHOOTER+[®] algorithm will analyze T°IN, T°OUT and ultrasound level and shape in the trap to give its condition result. Click .

The thermal camera will be automatically ON after some seconds. You can adjust emissivity ϵ if necessary with UP  and DOWN  buttons (0.90 per default). Freeze thermal picture by clicking on PHOTO keyboard button .


Click on **OK** keyboard button and place T°IN cursor with keyboard joystick. Valid with **OK**. Repeat the same for T°OUT.

Click **OK** to valid Escape icon  to save T°IN and T°OUT values. You can also save thermal picture if necessary




When you are ready (contact probe on the trap), do not move and click on **OK** keyboard button to START autogain



Then click on **OK** keyboard button to START measurement . Choose duration time of analysis (common is 30 s).

Do not move with contact probe during measurement and wait until STOP .

AUTO trap condition (*) result is given after 1 second. You can SAVE or ESCAPE it.

If you SAVE, take trap picture by clicking on PHOTO keyboard button  to freeze it and again to valid it. Go on virtual keyboard to give a name to the file and valid it with ENTER virtual keyboard button.

If you ESCAPE, program goes back to general STRAPSHOOTER+[®] menu.



(*) AUTO - TRAP CONDITIONS :



means trap condition is OK.
It can be CYCLING or MODULATING.



means trap condition is NOT OK.
It can be BIG LEAK or CLOSED or TOO
FAST CYCLING or DROWNED
(or NOT IN SERVICE)



means trap condition is NOT OK but
UNKNOWN. You need to investigate.



MAIN ICONS USED IN LEAKSHOOTER®



BLUETOOTH setting
(Headphones or speaker pairing)



AUTO OFF setting



White LED light ON/OFF



Internal or external
probes



Your use of compressed air / year
(8.760 h/year for 24h/24h use)



Your Nm³ compressed air cost
(for example 0.02 €).
Use # for special non standard money.



Frequency mixer setting
(42 kHz per default)



Clock & date settings



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Memory to access to stored photos (Visible+IR), 1 directory for leaks, 1 directory for STRAPSHOOTER®



K settings



↑ Temperature unit for thermal camera



USB link



↑ STRAPSHOOTER+® modes



FLIR thermal imager (black corner means temperatures T°IN and T°OUT have already been saved)



Scale setting for REAL TIME curve (0-30, 10-40, 20-50, 30-60, 40-70 dB)



ACCESSORIES LEAKSHOOTER® DETAIL

- Flexible 400mm
- Flexible 1500mm
- Contact probe
- 12V external battery
- Bluetooth headphones
- Bluetooth speaker
- Holster
- Ultrasonic dome



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LKS 1000 V2+ V3+

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SYNERGYS TECHNOLOGIES has been established in 1996 in France, to offer innovative and professional solutions for preventive and predictive maintenance.

SYNERGYS TECHNOLOGIES is the inventor of the ultrasonic visualization concept with the LEAKSHOOTER®, the thermal contour concept with the TSHOOTER® and of the MCP (Machine Condition Picture) concept with the VSHOOTER®.

We are present worldwide with professional and trained distributors.



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LEAKSHOOTER®
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