



Lane Liner



Operating Instructions

Before operating the machine, please read this manual thoroughly.
This manual should be retained for future reference.

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English

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Levab International and its subsidiaries assume no responsibility for any damage, loss, injury or claims by third parties which may arise through the use or malfunction of the **Lane Liner** lane conditioning machine.

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This document is available on the internet. Visit <http://www.bowling-products.com/LaneLiner/English/ManualNoStripper.pdf> for the latest version of this document.

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IMPORTANT TO SAFETY

READ THE FOLLOWING INSTRUCTIONS CAREFULLY



WARNING

To prevent fire or shock hazard, do not expose the machine to rain or moisture.

CAUTION!

1. **Handle the power supply cord carefully**
Do not damage or deform the power supply cord. If it is damaged or deformed, it may cause electric shock or malfunction when used. When removing from wall outlet, be sure to remove by holding the plug attachment and not by pulling the cord.
2. **Do not dismantle or open components inside**
NO USER- SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY. In order to prevent electric shock, do not dismantle or open any of the components inside the machine. If problems occur, contact your LEVAB dealer.
3. **Do not place anything inside**
Do not place metal objects or spill water inside the lane conditioning machine. Electric shock or malfunction may result. If any water gets inside, unplug the power supply cord and have a LEVAB service technician check your machine before further use.
4. **Connect the machine only to a grounding type power outlet**
If you are unable to insert the power supply plug into a grounding type power outlet, contact your electrician to replace your obsolete outlet.
5. **The LEVAB Lane Liner must be used only indoors**
Allowed range of air humidity is **60% - 95%**; allowed temperature range is **5°C - 35°C**. An electric shock or

malfunction of the machine may result from operating the machine outside of these conditions.

6. **The LEVAB Lane Liner is not suitable for handling toxic, acid, basic or inflammable fluids**

LEVAB will not be responsible for any damage, loss or injury as a result of the use of such.



Rating Label

Please, record and retain the following data. The serial number of your machine is shown on the rating label at the back side of the machine.

Type: Lane Liner _____
Serial No.: _____
Date of Installation: _____
Dealer: _____

Tel.: _____

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PRECAUTIONS

INSTRUCTIONS TO PREVENT FIRE, ELECTRIC SHOCK AND INJURIES

INSTALLATION

Before operating the machine be sure that the operating voltage of your machine is identical with that of your local power supply. The operating voltage is indicated near to the power inlet.

USE




1. Connect the power inlet only to a **three-wire grounding** type plug. If the machine is not grounded properly, the spraying of oil can cause build-up of static electricity which may cause shock and which could result in malfunction of electrical components.
2. Unplug the machine from the wall outlet during a thunder-storm or if it is not to be used for an extended period of time. Also unplug the machine from the wall outlet before cleaning it.
3. Take care that the machine is not dropped to avoid injuring yourself or damaging the cabinet which defeats safeguards. If the cabinet has been damaged, unplug the machine and have it checked by a qualified technical expert to restore the safeguards.
4. Do not move or displace the machine in any other way than indicated in this manual. Transportation of the machine is not allowed except in/on trolleys or carts which the manufacturer has approved. In no circumstance is it allowed to lift the machine off its caster wheels.
5. Never block the ventilation openings of the machine.
6. Never place the machine near sources of heat, such as stoves, ovens, radiators or any other machine that generates heat.
7. After a bowling lane has been oiled, **DO NOT walk on the lane**. The surface of the lane will be very slippery because a thin layer of oil has been deposited on it.
8. For normal usage according to the above guidelines, no personal protection needs to be worn or carried.

SERVICING

For normal operations, no special training is necessary. The servicing of the machine must not be attempted by yourself beyond that described in the operating instructions. Installation, calibration and repairs to the machine must be done by a qualified technical expert. In case of problems that cannot be settled by referring to your operating instructions, unplug the power supply cord and contact your LEVAB dealer. No user-serviceable parts are inside the machine.

FEATURES

The **Levab Lane Liner** is a unique lane conditioning machine that uses the **Direct Spray Application**  method to directly apply the lane conditioner fluid onto your bowling lanes. Extensive research has resulted in a machine that offers exceptional control over the oil pattern, both along the length and across the width of the lane. The Lane Liner produces a consistent oil pattern from lane to lane, from day to day, and from season to season. The influence of external factors such as temperature, humidity, dust, and lane irregularities to the oil pattern has been practically eliminated.

1. Perfect Positioning

During a conditioning session, the built-in computer always knows exactly the position and speed of the machine on the bowling lane. This enables accurate control of the drive motor which, in combination with a dynamic electronic brake, causes the machine to always stop exactly on the foul line.

2. Self-calibrating

The Lane Liner calibrates its speed by measuring the friction while rolling along the lane.

3. Built-in Jamming Protection

While the machine is rolling along a lane, the speed is constantly monitored. When the machine appears to be jammed, the drive motor is immediately switched off to prevent damage being done.

4. Simple to Adjust Oil Pattern

The shape of the oil pattern along the length of the lane can be easily modified with the built-in English LCD display unit. Amongst many others, the following parameters can be adjusted:

- the distance along which the oil must be applied,
- the thickness of the oil pattern just behind the approach, and
- the gradient of the oil pattern along the lane.

Once the desired pattern has been established, the Lane Liner will consistently apply this pattern to all your lanes, regardless of external influences such as temperature, humidity, dust, and lane irregularities.



Built-in LCD display unit

5. Soft Mounting and Unmounting

The carefully designed, lightweight construction makes it easy to transfer your machine onto and from your bowling lane. This means no more loud bangs, no more crashes onto a lane, and no more lane damage. Having the center of gravity located at the back of the machine, it is very easy to tilt it onto its back casters and roll it to and from the storage space.

6. Self-diagnostic System

Oil level, drive speed and air pressure are continuously monitored. If any problem occurs, this is indicated and the most probable cause can be read out with the built-in LCD display unit.

We are convinced that the Levab Lane Liner is the conditioning system for the future. We wish you and your bowling players a lot of bowling pleasure with this unique system.

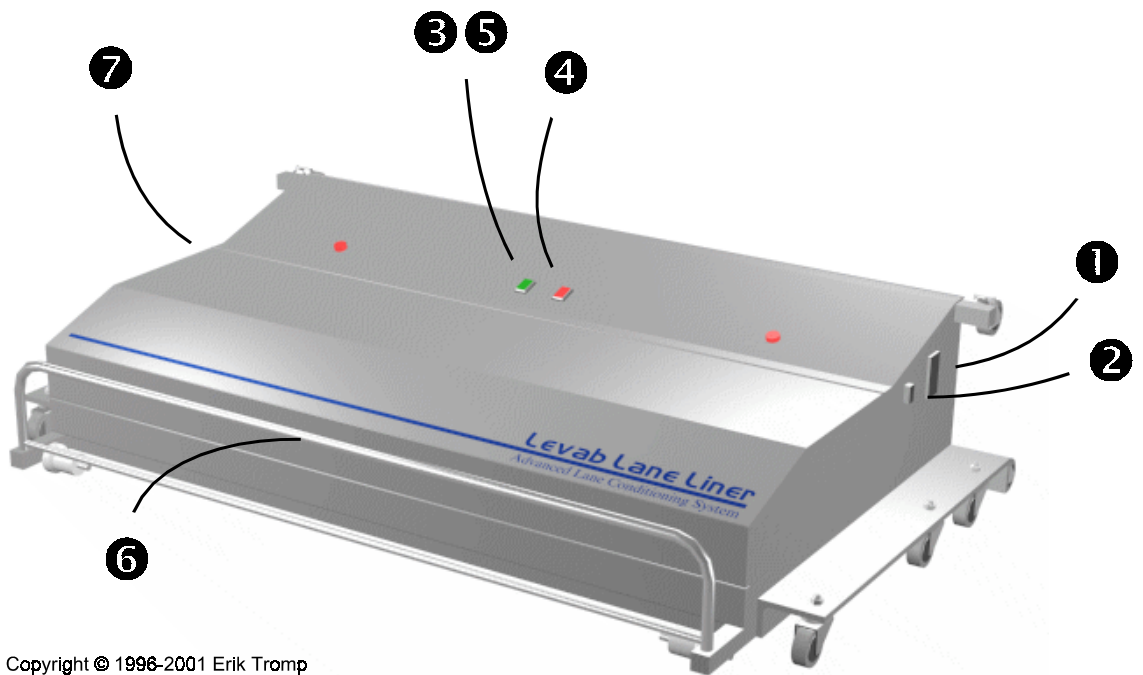
Heiloo, The Netherlands - March 24, 1997.

Erik Tromp,
Aad Breed

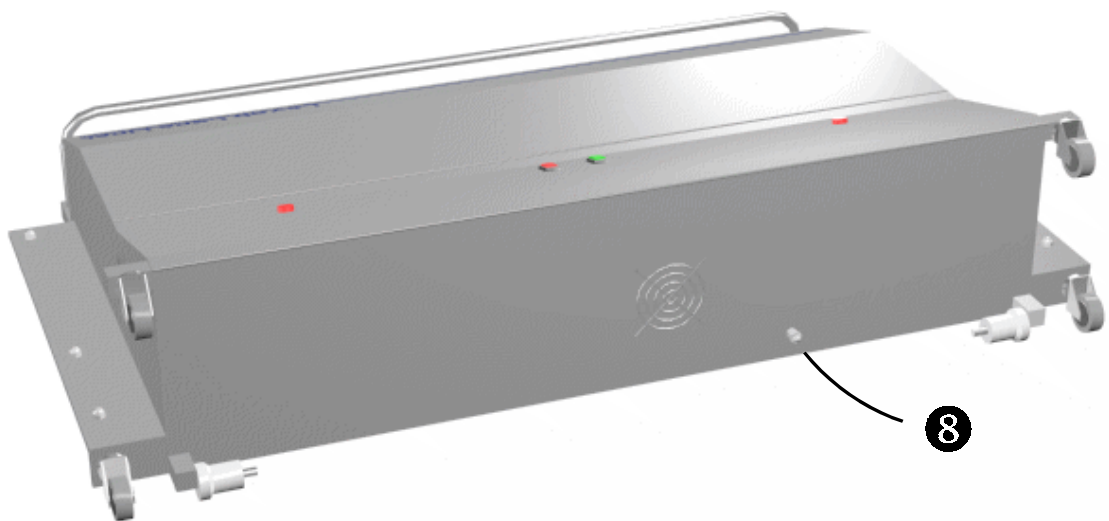
Levab International

FUNCTION OF CONTROLS

The numbers in the illustrations are keyed to the following explanations.



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❶ Power Inlets and Fuse Holders

The Lane Liner contains two touch-safe main power inlets, one on each side of the cabinet. Use either inlet to connect the machine to the main power supply.

Connect a power inlet only to a **three-wire grounding** type plug. If the machine is not grounded properly, the spraying of oil can cause build-up of static electricity that may cause shock and which could result in malfunction of electrical components.

The fuse holders on either side contain one transparent glass fuse, each of 250 V, 10 Ampere, slow (component no. 1124, can be ordered from your LEVAB dealer or directly from Levab International).



IMPORTANT: The machine is delivered with only **one** power connector. Should you by any circumstance have two power connectors at your disposal, **never** hook up the main power supply via **both** power inlets. High-voltage short-circuit may result, which will blow the fuses in the fuse holders.

❷ PC Connector

On machines **without a built-in LCD display unit**, this connector can be used to connect the machine to a Windows PC or Palm Pilot handheld. Run the '**Liner Panel**' or '**Palm Panel**' software package to adjust the shape of the oil pattern along the lane, and to read any data stored within the machine (such as counters). A connection cable is included in the delivery, but it can also be ordered from your LEVAB dealer or directly from Levab International (component no. 1254).

On machines **with a built-in LCD display unit**, no PC connector is present.



Palm Panel



Liner Panel

3 Start Indicator

The start indicator is integrated with the Start Button 5. It will burn continuously when the machine is ready to condition a lane. The indicator will flash while conditioning the lane, or when the conditioning session is temporarily halted, or if the machine has jammed.

If this indicator is off, there is not enough oil in the internal oil tank (the Error-indicator 4 will burn continuously). In this case, the machine cannot be started.

4 Error Indicator

When this indicator burns continuously, the level of the oil in the internal oil tank is running low. When this indicator flashes, the internal self-diagnostics has flagged a defect. In that case, see 'Trouble Checks' on page 39.

5 Start Button

Press this button once to initiate a lane treatment session; the lane treatment will be done according to the settings as stored in the machine.

Press this button twice in quick succession ('double-click') to initiate a short-run oiling session (oil the lane only over the first few feet).

Pressing this button while a conditioning session is in progress will temporarily halt the session; the session can be resumed by first rolling the machine 10-15 centimeters back along the lane and then pressing the start button again. A session can be aborted by holding down the start button continuously for a period of approx. 4 seconds, until the air pump switches off.

6 Handle bar

Use the handle bar to transfer the machine between the lanes, and to roll it to and from the storage space. An extra large, tip-up handle bar is also available.

7 Oil Re-filling Plug

Use this plug to supply the machine with oil. See 'Supplying Oil' on page 17 for more information on this topic.

⑧ Drain Plug

Open this plug to drain the waste oil, which collects in the mist extractor unit. See 'Draining Waste Oil' on page 18 for more information.

⑨ Air Filter

While the lane is being oiled the generated spray mist will be extracted and locked into this filter. When the filter is saturated the oil will be pulled through the filter and end up in an internal container from where it needs to be drained about once a week.

⑩ Equalizer Brush

This brush will equalize the oil which is applied onto the lane during oiling.

DAILY OPERATION

SWITCHING ON THE MACHINE

Whenever the machine is switched on it will go into standby mode. None of the electrical components will be switched on until the machine is operated. After operation, the electrical components will be switched off one by one until the standby mode is reached again.

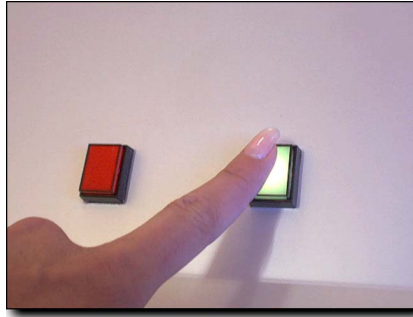
1. Roll the machine onto the approach and tilt it into its horizontal position. To do this, **grab the straight bar beneath the handle bar** ⑥ and pull it toward you; prevent the machine from rolling toward you by holding it with your foot.
2. Make sure the power supply cord is connected to a wall outlet, and that it is sufficiently long to enable the machine to cover the full length of the bowling lane.
3. Wait until the self-diagnostic test has been done. The self-diagnostic test will take approx. 3 seconds, during which both the start indicator ⑤ and the error indicator ④ lights should be on (if one or more is not, please refer to 'Trouble Checks' on page 39).

MOUNTING THE MACHINE ONTO A BOWLING LANE

1. Grip the handlebar ⑥ with both hands and guide the machine just before the foul line of the bowling lane.
2. Make sure the machine is center-aligned to the lane.
3. Move the machine forward until the four **rear casters** hang free above the gutters.
4. Gently tilt the machine so that the back **conductor wheels** touch the lane surface. Both front casters will be lifted off the approach surface.
5. Move the machine forward until the next pair of **casters** roll into the gutters.
6. Gently lower the handlebar ⑥ until the **front pair of casters** touch the approach surface.
7. Move the machine forward until the **front conductor wheels** rest on the lane surface.

CONDITIONING A LANE

1. Make sure the start indicator **3** within the start button **5** burns continuously. (If this is not the case, turn to page 39, 'Trouble Checks').
2. Press the illuminated green start button **5**. The air pump will be switched on and after a few seconds the machine will start moving. The start indicator **3** will flash.



Press start button

3. Wait until the machine has returned to the foul line and stops moving.
4. Wait until the start indicator **3** has stopped flashing. The machine can now be safely transferred to the next lane.



Note: As long as the start indicator **3** is blinking, there is still oil mist inside the spraying compartment. If you pull the machine onto the approach, the mist will deposit onto the approach. Therefore, wait until the activity indicator has stopped blinking before transferring the machine to the next lane!

To temporarily halt the session, briefly press the flashing green start button **5**. To resume, roll the machine 10-15 cm back along the lane and briefly press the illuminated blue start button **5** again. To completely cancel the session, hold down the start button **5** for approx. 4 seconds until the air pump switches off.

PERFORMING A 'SHORT-RUN' ON A LANE

1. Press the illuminated green start button **5** twice in quick succession ('double-click'). The machine will only oil the lane over the first few feet.

TRANSFERRING THE MACHINE TO THE NEXT LANE

1. Grip the machine at the handle bar **6** with both hands. Slightly lift the machine and pull it toward you so that the front casters rest on the approach.
2. Pull the machine toward you and lift the machine onto its middle casters.

3. Tilt the machine over its middle casters by pushing **down** the handlebar ⑥. Pull the machine further toward you until the back casters rest on the approach.
4. Guide the machine to the next lane and follow the instructions under 'Mounting the Machine onto a Bowling Lane'.



Note: Push the machine **downwards** when rolling it off the lane. This will make the transfer much easier!

CLEANING UP AND STORING THE MACHINE

1. Tilt the machine in its upright position. To do this, grab the straight bar beneath the handlebar ⑥; **it is much easier to tilt the machine when grabbing the straight bar!**
2. Clean the equalizer brush ⑩. Remove remaining dust, moist and fluid from the brush with a soft cloth.



Clean equalizer brush

-
3. Guide the machine to the storage space.

SPECIAL OPERATIONS

In addition to daily operation, the following special operations will have to be performed regularly:

- Supplying oil
- Reading the oil pattern into the '**Liner Panel**' software.

You also may have to:

- Drain any air that has collected in the oil tubes
- Replace the oil by a new type
- Adjust the power of the mist extractor unit

The following should **never** be done:

- Clean the liquid and air orifices in the oil spray nozzles.

SUPPLYING OIL

When the level of the oil in the internal tank starts to run low, the error indicator **4** will turn on and burn continuously. There will be enough fluid left to oil another 10-12 lanes.

In a bowling of 20 lanes the oil will have to be re-filled approximately twice every week.

Re-filling the oil requires the following actions:

1. Disconnect the power supply from the power inlet **1**.
2. Turn open the air relief valve next to the oil re-filling plug **7**.



Turn open air relief valve

3. Remove the cap from the re-filling plug **7**.
4. Place a funnel in the plug opening.

5. Pour **at the most one liter (0.25 gallon)** of oil through the funnel into the tank.



Pour oil into the oil tank

6. Place the cap back on the re-filling plug **7** and tighten it firmly with your hand.
7. Close the air relief valve.
8. Re-connect the power supply to the power inlet **1**.

DRAINING WASTE OIL

It is recommended to drain the waste oil from the mist extractor unit each time new oil is supplied.



Warning: When there is too much waste fluid in the mist extractor unit, the extractor fan will scoop the waste fluid and blow it out through the air exit tubes.

Draining the waste oil requires the following actions:

1. Switch on the machine.
2. Position the machine on a lane.
3. Press the illuminated green start button **5** to start a conditioning session. As soon as the machine starts to move, press the flashing green start button **5** once again to temporarily halt the conditioning session. The mist extractor fan will keep on running.
4. Place a small watertight container under the drain plug **8**.
5. Open the drain plug **8**.
6. Press two fingers on the air exits of the mist extractor.
7. The waste oil will now flow out of the drain plug under light pressure.
8. Wait until most of the waste oil has flown out, then close the drain plug.
9. Turn off the mist extractor by pressing the the flashing green start button **5** for 4 seconds.
10. The waste oil cannot be re-used because it may be polluted. Dispose of it in the same way as you dispose of the waste water from your lane stripper.

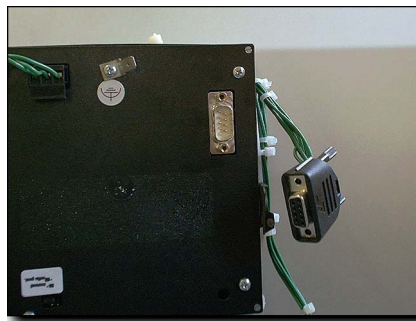
READING THE OIL PATTERN INTO THE 'LINER PANEL' SOFTWARE

At delivery of the machine, the oil thickness across the lane will be measured and stored in the Lane Liner, so that the thickness of the oil pattern can be accurately adjusted.

If you have a 'Computer Lane Monitor™' (CLM Tape Reader) and know how to operate it, reading the oil pattern is quite simple.

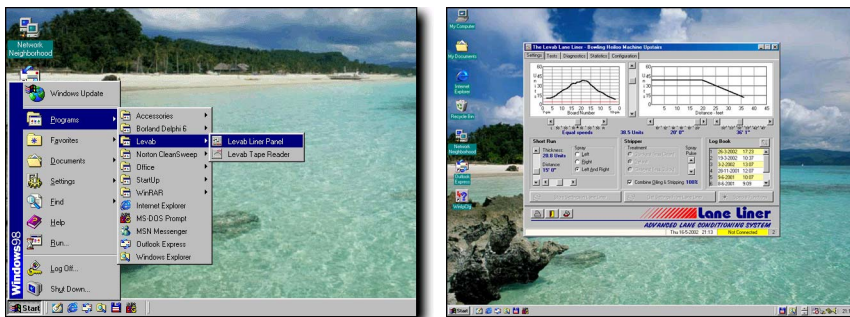
Preparation

1. Make sure you have installed the 'Levab Liner Panel' and 'Levab Tape Reader' software on your PC. You can download this software from our web page <http://www.bowling-products.com>.
2. Switch on the CLM Tape Reader and start the UV lamp.
3. Mount the Lane Liner machine at the start of a bowling lane. Open the lid of the control compartment and unplug the programming cable from the LCD display unit. Then switch on the Lane Liner.



Unplug the programming cable from the LCD display before switching on the Lane Liner.

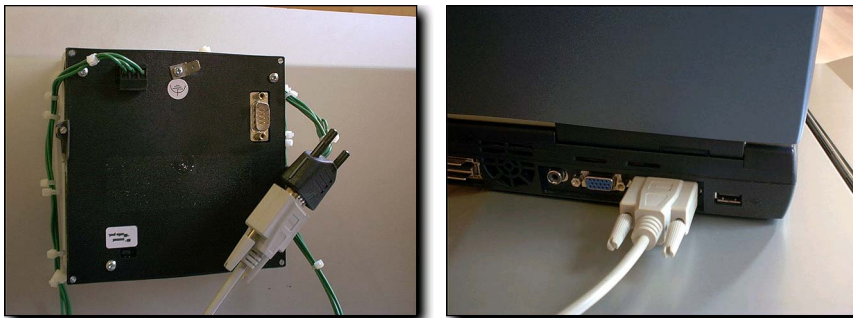
4. Make sure the PC is switched on, launch MS-Windows and double-click the 'Levab Liner Panel' icon in the 'Levab' program group.



Launch the 'Levab Liner Panel' software.

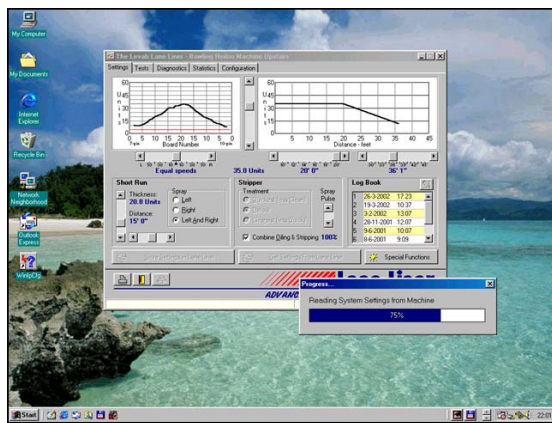
Reading current machine settings

- Use the serial cable supplied with the CLM Tape Reader to connect the **Lane Liner** through the just unplugged programming cable to a free COM-port on the PC or notebook computer.



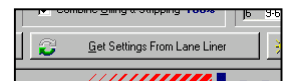
Connect the Lane Liner to the PC via the serial extension cable.

- The 'Levab Liner Panel' software will connect to the Lane Liner and read all settings into the PC or notebook computer.



The 'Liner Panel' software will read all machine settings into the computer.

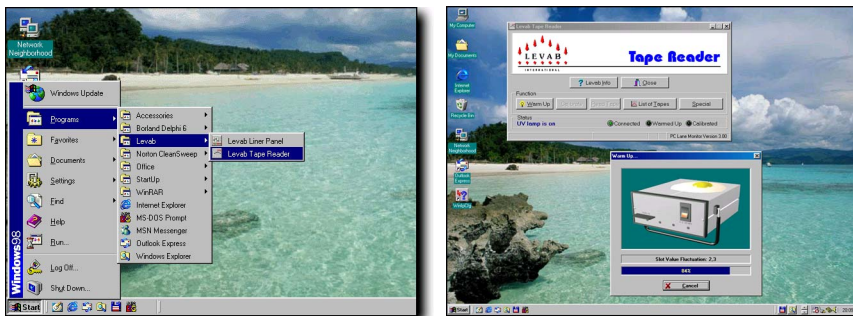
- When all settings have been read, click the button '**Get Settings From Lane Liner**' to have the current settings shown on the screen
- Close the 'Levab Liner Panel' by clicking the small 'X' button in the upper right corner of the program window.



Measuring the current oil pattern

- Use the serial cable to connect the **CLM Tape Reader** to the PC or notebook computer. Make sure the CLM is switched on and the U.V. lamp is started.

10. Double-click the 'Levab Tape Reader' icon in the 'Levab' program group. The Tape Reader software will be launched and it will connect to the CLM.



Launch the 'Levab Tape Reader' software.

11. While the CLM is warming up (5-10 minutes), a tape can be taken from the lane in the usual manner; see also the CLM manual. The tape should be taken at approximately 10 feet (3 meters) from the foul line.
12. After the CLM is warmed up, the measurement slot needs to be calibrated with the three supplied calibration strips. Follow the instructions on the screen to perform the calibration.



Calibrate the measurement slot of the CLM Tape Reader.

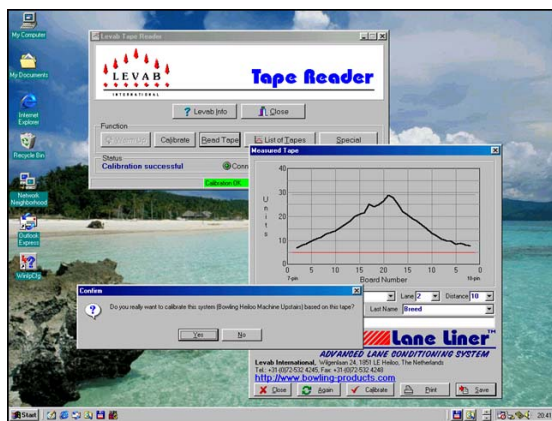
13. Pass the tape through the CLM.



Pass the tape through the CLM Tape Reader.

Making the link between the machine settings and the current oil pattern

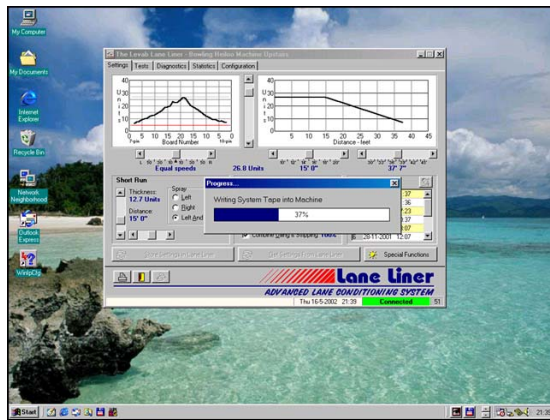
14. If the tape has been measured successfully, it will be shown in a window on the screen. Click the 'Calibrate' button to register the tape and at couple the tape with the current Lane Liner settings.



Click the 'Calibrate' button.

15. Use the serial cable to connect the **Lane Liner machine** to the PC or notebook computer

16. When the 'Levab Liner Panel' software is now launched, the measured tape will be directly visible. The 'Levab Liner Panel' will automatically store the into the Lane Liner. In this way the LCD display unit can accurately show the oil thickness at various oiling speeds.



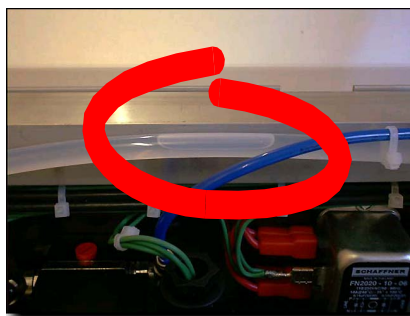
When the 'Levab Liner Panel' software is launched, the tape will be visible and written into the machine.

Finalize

17. Close the 'Levab Liner Panel' by clicking the small 'X' button in the upper right corner of the program window.
18. Unplug the serial cable from the PC or notebook computer to the Lane Liner machine. Power-off the Lane Liner, re-connect the programming cable into the LCD display, then switch on the Lane Liner.

DRAINING AIR FROM THE OIL TUBES

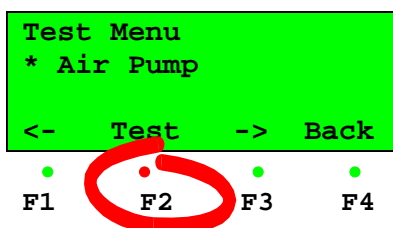
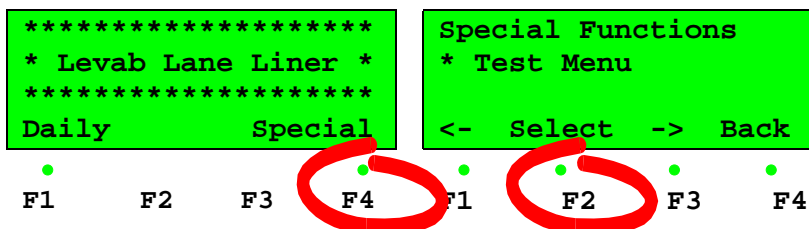
To be sure that the oil is optimally applied onto the lane, it is necessary that no air bubbles are visible in the two transparent pieces of tube connected to the spray nozzles.



Undesirable air bubbles in the oil tubes should be drained

If air bubbles are visible (or worse: there is no oil at all in the tubes), the air must be let out. This can be done as follows:

1. Switch on the machine and make sure the start indicator ③ within the start button ⑤ burns continuously. (If this is not the case, turn to page 39, 'Trouble Checks').
2. Press the illuminated green start button ⑤ to start a conditioning session. As soon as the machine starts to move, press the flashing green start button ⑤ once again to temporarily halt the conditioning session. The air pump will keep on running.
3. You can also use the test menu in the LCD display, switch on the air pump.

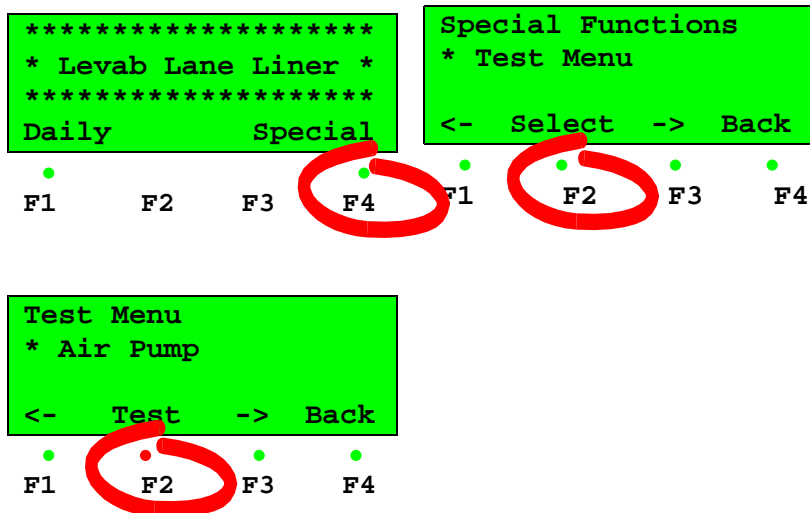


4. For the left spray nozzle, turn open the shut-off plug at the top of the nozzle. The oil should now pour out. If the air bubbles do not move, turn the plug open further.
5. If the air bubbles have disappeared, wait another 10 seconds before tightening the shut-off plug; this is to ensure there is no more air left in the nozzle.
6. Repeat items 3 and 4 for the right spray nozzle.
7. Switch off the air pump by pressing the F2 button on the LCD display.
8. The drained oil can be re-used provided it is not polluted.

REPLACING OIL BY A NEW TYPE

If you want to switch over to a new type of oil, you will have to drain the current oil from the machine. If you do not drain it, the current oil will mix with the new oil.

1. Switch on the machine and make sure the start indicator ③ within the start button ⑤ burns continuously. (If this is not the case, turn to page 39, 'Trouble Checks').
2. Press the illuminated green start button ⑤ to start a conditioning session. As soon as the machine starts to move, press the flashing green start button ⑤ once again to temporarily halt the conditioning session. The air pump will keep on running.
3. You can also use the test menu in the LCD display, switch on the air pump.

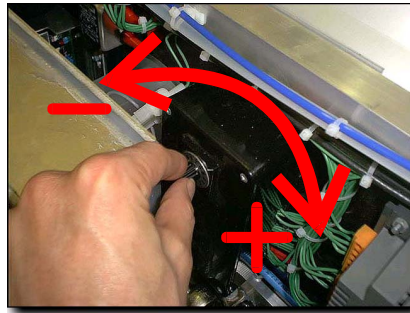


4. From the left spray nozzle, disconnect the transparent tube. To do this, push the tube into the fastener on the nozzle, hold back the quick-disconnect ring, then pull back the tube out of the fastener.
5. The oil will now pour out of the tube under slight pressure. Wait until no more fluid comes out.
6. Connect the tube back to the nozzle. Press the tube firmly into the fastener, then pull it back to secure the connection.
7. Repeat items 3, 4 and 5 for the right spray nozzle.
8. Switch off the air pump by pressing the the flashing green start button **5** for 4 seconds, or by pressing the F2 button on the LCD display.
9. Fill the oil tank with at the most two liters (0.4 gallon) of the new oil (see also 'Supplying Oil' on page 17).
10. The air in the oil tubes must now be thoroughly drained. This is described in 'Draining Air from the Oil Tubes' on page 23.

ADJUSTING THE POWER OF THE MIST EXTRACTOR UNIT

During regular operation the air filter **9** will gradually saturate with oil. This is not a problem, on the contrary: a saturated air filter will capture more oil mist particles out of the air than a clean filter. However, it may be necessary to adjust the power of the extractor fan to increase the air flow through the mist extractor unit.

The power of the mist extractor fan can be adjusted by turning the black knob located on the black regulator box which can be found in the middle of the control compartment. Turning it clock-wise gives more power; turning it counter-clock-wise gives less power.



Adjusting the power of the mist extractor unit

The mist extractor unit should be adjusted to the minimally necessary air flow: it should pull out just so much air that hardly any spray mist escapes from the spraying compartment.

DO NOT CLEAN THE LIQUID AND AIR ORIFICES IN THE OIL SPRAY NOZZLES

The shut-off needles will automatically clean the liquid orifices every time the lane is oiled. Manual cleaning may cause damage to the orifices.

LCD DISPLAY INFORMATION AND KEY FUNCTIONS

LCD DISPLAY INFORMATION

Your LCD display will help you to:

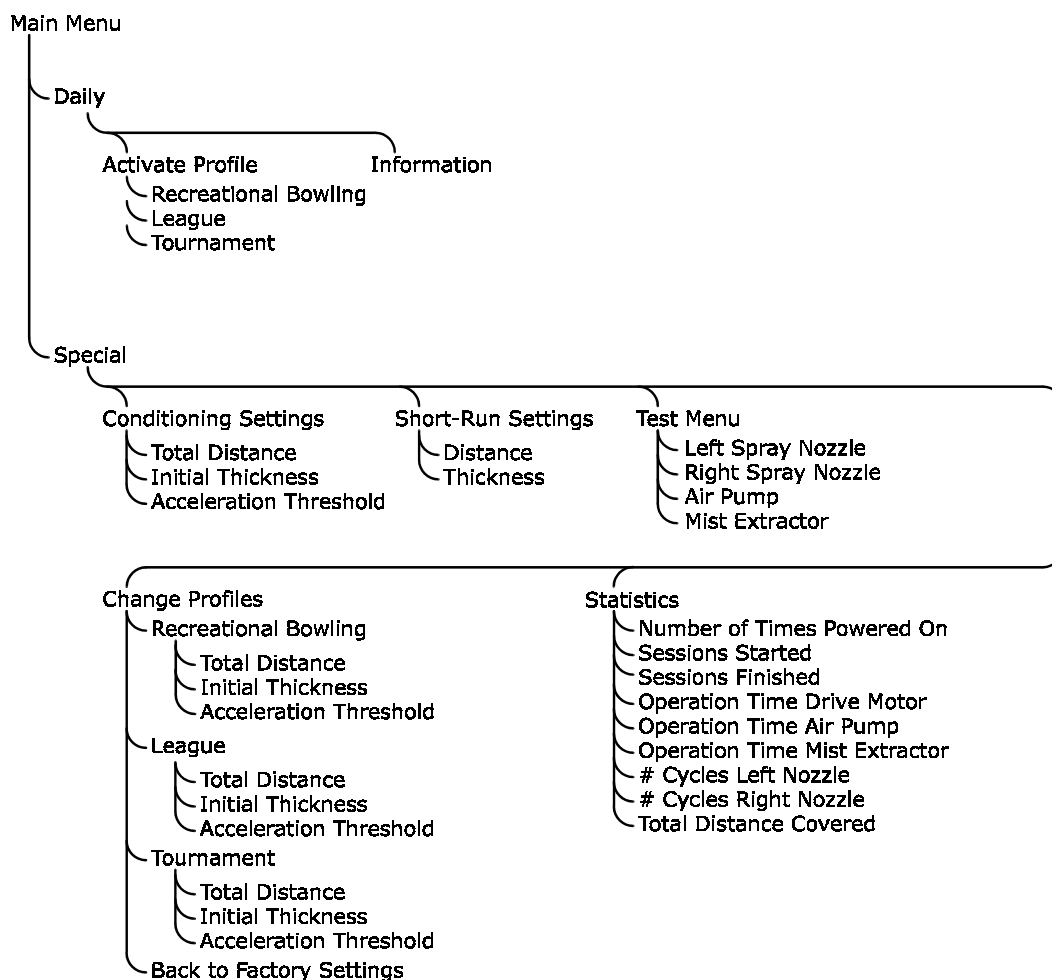
- Choose the operational mode of your Lane Liner,
- Adjust the oiling and short-run settings of your machine,
- Perform tests on various electrical components inside your machine,
- Read statistics, and
- Read diagnostic messages.

All functions can be selected using the display's menu system. You use the menu system every time you want to perform one of the actions mentioned above.

The menus are arranged in a continuous loop. Each menu contains a list of options. Most menus have sub-menus with additional options. The menus with their sub-menus form a menu structure, which is shown in the following figure.

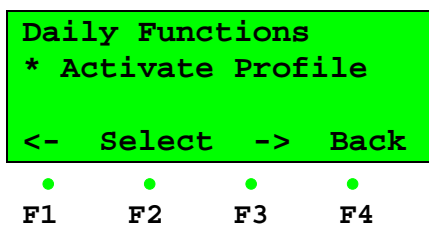


LCD display unit



Scrolling through the menu and selecting options is done via the softkeys F1, F2, F3 and F4. In each menu displayed, the bottom line shows the function of each of the softkeys. At the same time, the coloured LED's inside the softkeys indicate that a key can be pressed.

Example:

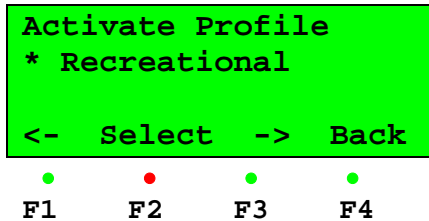


In this example, press F1 to scroll to the previous menu item. Press F2 to select the current menu item. Press F3 to scroll to the next menu item. Press F4 to return to the previous menu level.

For some settings it is possible to choose between various options. As with the menus, you can press the F1 or F3 keys to cycle through the available options. The coloured LED above the F2 button indicates if an option is currently selected:

- If the LED above the F2 key lights up **red**, the shown option is currently not selected and can be selected by pressing the F2 key.
- If the LED above the F2 key lights up **green**, the shown option is currently selected. Pressing the F2 key in this case will cause no change.

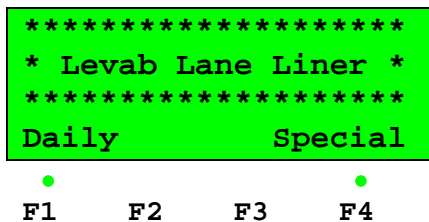
Example:



In this example, the shown Profile (Recreational) is **not** selected (red LED above the F2 button). It can be selected by pressing the F2 key (the LED above the F2 button turns to **green**).

MAIN MENU

The main menu is shown below.



From the main menu, two sub-menus can be selected: the menu for daily functions (press F1) and the menu for special functions (press F4).

DAILY FUNCTIONS MENU

In the daily functions menu, you can:

- Activate a pre-defined oiling profile, and
- View information about the Lane Liner.

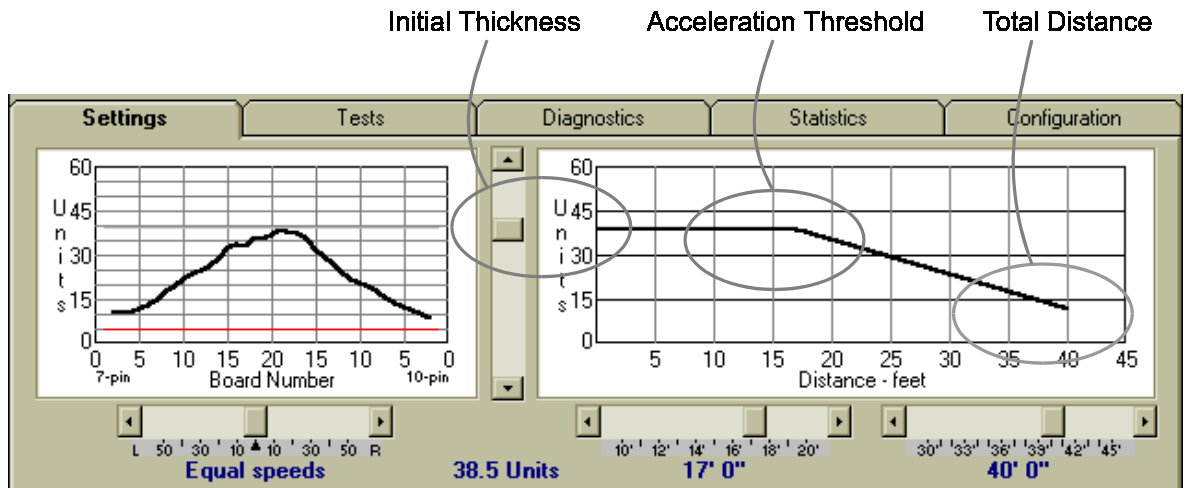
Pre-defined Oiling Profiles

An oiling profile is a set of three parameters that control the amount of oil applied along the lane:

- **Initial Thickness:** the amount of oil (measured in units) that is applied at the front end of the lane (foul line).
- **Acceleration Threshold:** the distance (measured in feet) along the lane at which the machine will start accelerating in order to gradually decrease the oil thickness.

- **Total Distance:** the distance (measured in feet) along the lane at which the machine will stop applying oil.

In the next figure, these three parameters are illustrated; the left graph showing the distribution of oil across the width of the lane and the right graph showing the distribution of oil along the length of the lane. In the shown figure, the initial thickness value is 38.5 units, the acceleration threshold is at 17 feet and the total distance is 40 feet.



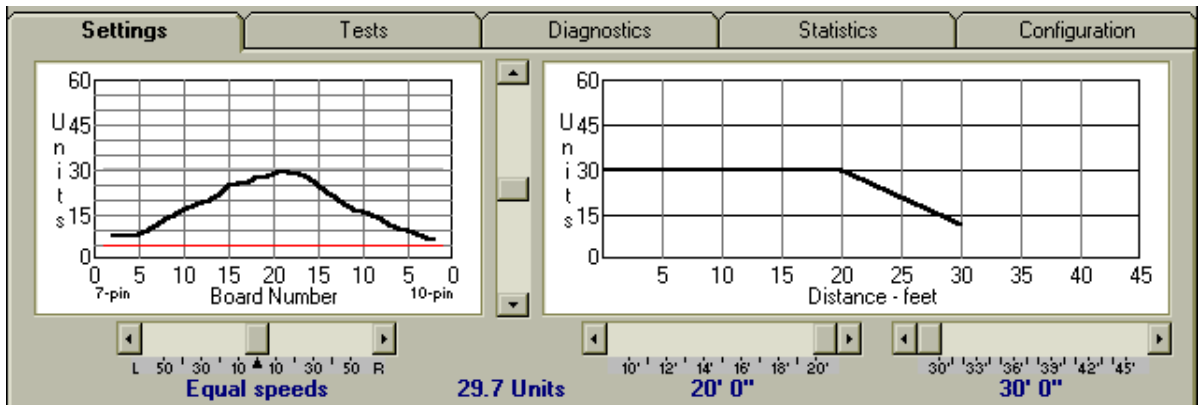
There are three pre-defined oiling profiles stored in your Lane Liner:

- Recreational Bowling,
- League, and
- Tournament.

By default (when the machine is shipped from the factory), the values in the pre-defined profiles are set as follows:

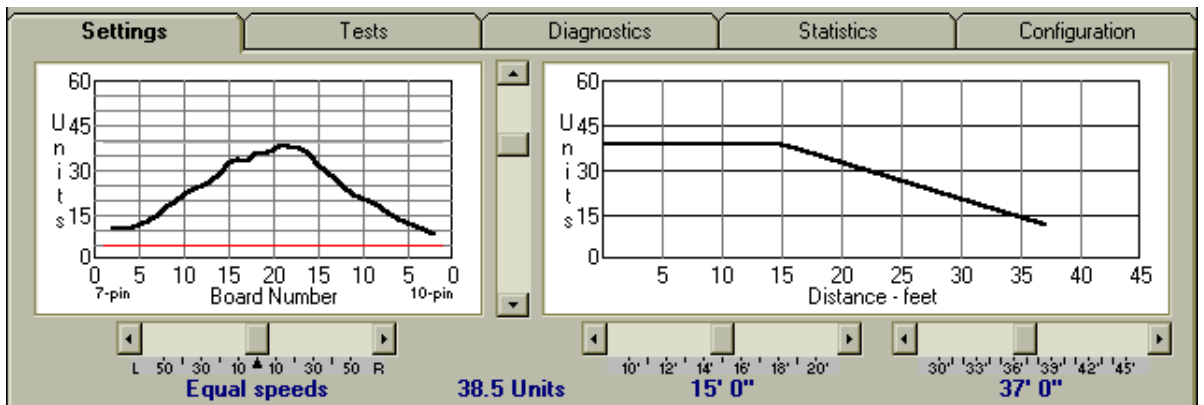
- **Recreational Bowling:**
 - Initial Thickness: **60%** of the maximum possible thickness
 - Acceleration Threshold: **20 feet**
 - Total Distance: **30 feet**

The figure below shows an example of this profile. Note that the oil thickness may differ from that of your machine, since the oil thickness depends on your specific oil pressure and oil spray nozzle configuration.



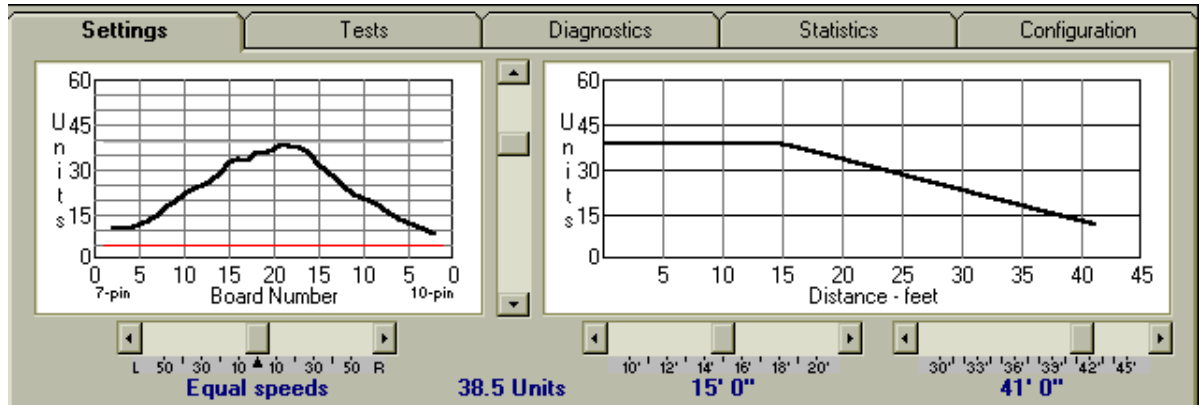
- **League:**
 - Initial Thickness: **80%** of the maximum possible thickness
 - Acceleration Threshold: **15 feet**
 - Total Distance: **37 feet**

The figure below shows an example of this profile; as mentioned previously the shown oil thickness may differ from machine to machine.



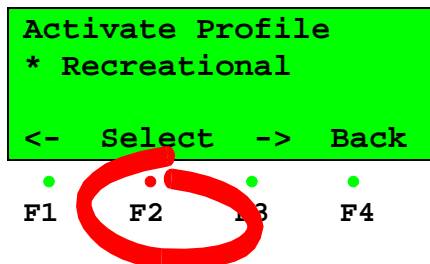
- **Tournament:**
 - Initial Thickness: **80%** of the maximum possible thickness
 - Acceleration Threshold: **15 feet**
 - Total Distance: **41 feet**

The figure below shows an example of this profile; as mentioned previously the shown oil thickness may differ from machine to machine.



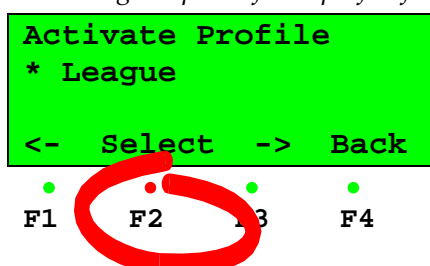
You can change the pre-defined profiles in the **Special Functions Menu**. In the **Daily Functions Menu** it is only possible to *activate* one of the pre-defined profiles. The selected pre-defined profile will remain active until another pre-defined profile is chosen, or until the oiling settings are changed directly through the **Special Functions Menu**, sub-menu **Oiling Settings**.

- *Activating the pre-defined profile for Recreational Bowling*



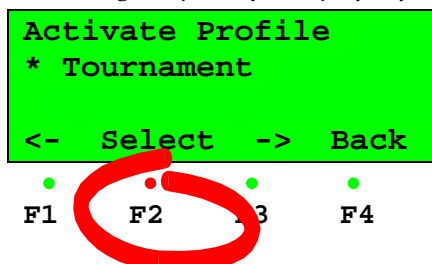
From the main menu, select **Daily**, scroll to **Activate Profile** (F1/F3), press **Select** (F2), scroll to **Recreational** (F1/F3) and press **Activate** (F2). To indicate this pre-defined profile has now been activated, the LED above the F2 key will turn from red to green (if it wasn't already green). Press **Back** (F4) twice to return to the main menu.

- *Activating the pre-defined profile for League Bowling*



From the main menu, select **Daily**, scroll to **Activate Profile** (F1/F3), press *Select* (F2), scroll to **League** (F1/F3) and press *Activate* (F2). Press *Back* (F4) twice to return to the main menu.

- *Activating the pre-defined profile for Tournament Bowling*



From the main menu, select **Daily**, scroll to **Activate Profile** (F1/F3), press *Select* (F2), scroll to **Tournament** (F1/F3) and press *Activate* (F2). Press *Back* (F4) twice to return to the main menu.

View information about the Lane Liner

This menu simply shows how to contact Levab International. Select **Daily**, scroll to **View Information** (F1/F3), press *Select* (F2) and scroll through the information displayed.

SPECIAL FUNCTIONS MENU

In the special functions menu, you can:

Adjust the oiling settings manually	page 33
Adjust the settings of the short-run program	page 35
Perform various tests	page 36
Read the statistics of the machine	page 36
Adjust the pre-defined oiling profiles	page 36
Reset the pre-defined oiling profiles to their factory-default values	page 37

Adjusting the Oiling Settings Manually

The oiling settings consist of three parameters that control the amount of oil applied along the lane (see also 'Pre-defined Oiling Profiles' on page 29):

- **Initial Thickness:** the amount of oil (in units) that is applied at the front end of the lane (foul line).
- **Acceleration Threshold:** the distance (feet) along the lane at which the machine will start accelerating in order to gradually decrease the oil thickness.
- **Total Distance:** the distance (feet) along the lane at which the machine will stop applying oil.

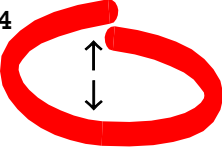
The oiling settings can be chosen by activating one of the pre-defined oiling profiles via the **Daily Functions** menu. However, it is also possible to manually choose the oiling settings. As an analogy

consider a radio, which has a tuning dial to manually tune into a station, and a number of pre-set buttons which you can program to directly tune in on your favourite stations.

- *Manually adjusting the initial thickness*

```
Oiling Settings
* Initial Thickness:
  35 units of oil
<-          -> Back
```

F1 F2 F3 F4

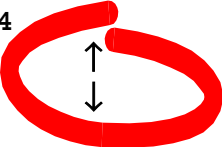


From the main menu, select **Special**, scroll to **Oiling Settings** (F1/F3), press *Select* (F2) and scroll to **Initial Thickness** (F1/F3). The current setting is shown; use the up and down keys on the right hand side of the keyboard to adjust the value one step at a time. Press *Back* (F4) twice to return to the main menu.

- *Manually adjusting the acceleration threshold*

```
Oiling Settings
* Acceleration
  Threshold: 15 feet
<-          -> Back
```

F1 F2 F3 F4

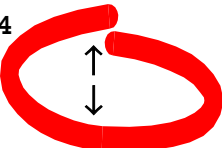


From the main menu, select **Special**, scroll to **Oiling Settings** (F1/F3), press *Select* (F2) and scroll to **Acceleration Threshold** (F1/F3). The current setting is shown; use the up and down keys on the right hand side of the keyboard to adjust the value between 10 and 20 feet. Press *Back* (F4) twice to return to the main menu.

- *Manually adjusting the total distance*

```
Oiling Settings
* Total Distance:
  35 feet
<-          -> Back
```


F1 F2 F3 F4



From the main menu, select **Special**, scroll to **Oiling Settings** (F1/F3), press *Select* (F2) and scroll to **Total Distance** (F1/F3). The current setting is shown; use the up and down keys on the right

hand side of the keyboard to adjust the value between 30 and 45 feet. Press *Back* (F4) twice to return to the main menu.

Adjusting the Settings of the Short-Run Program

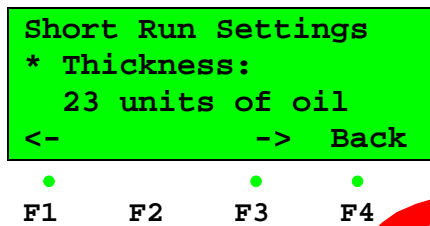
The short-run program will be executed when you press the illuminated green start button  twice in quick succession ('double-click'). The machine will not do any stripping; it will only oil the lane over the first few feet.

The short-run settings consist of two parameters that control the amount of oil applied along the lane:

- **Thickness:** the amount of oil (in units) that is applied.
- **Distance:** the distance (feet) along the lane at which the machine will stop applying oil.

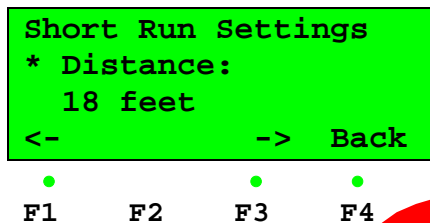
There are no pre-defined settings for the short-run program. The only way to set them is through the **Special Functions** menu.

- *Adjusting the short-run thickness*



Select **Special**, scroll to **Short Run Settings** (F1/F3), press *Select* (F2) and scroll to **Thickness** (F1/F3). The current setting is shown; use the up and down keys on the right hand side of the keyboard to adjust the value one step at a time.

- *Adjusting the short-run distance*



Select **Special**, scroll to **Short Run Settings** (F1/F3), press *Select* (F2) and scroll to **Distance** (F1/F3). The current setting is shown; use the up and down keys on the right hand side of the keyboard to adjust the value between 10 and 20 feet.

Performing Various Tests

In order to diagnose problems it can be useful to switch on the various electrical components individually. The following components can be switched on or off:

- the left oil spray nozzle,
- the right oil spray nozzle,
- the air pump, and
- the mist extractor.

It is possible to turn on more than one component simultaneously. When the air pump is turned off it cannot be turned on for the next 6 seconds; this time is needed for the air system to release all pressurized air.



Note that while you are in the test menu, the machine cannot be started; pressing the green start button **5** will have no effect. The start indicator **5** will turn off to indicate this.

Reading the Statistics of the Machine

While in use, the built-in computer keeps track of how often or how long some vital parts are used. The following statistics are kept:

The number of times the machine has been switched on,
The number of lane treatment sessions started,
The number of lane treatment sessions finished,
The total time in hours the drive motor has been used,
The total time in hours the air pump has been used,
The total time in hours the mist extractor has been used,
The number of operational cycles of the left oil spray nozzle,
The number of operational cycles of the right oil spray nozzle,
The total distance traveled.

Adjusting the Pre-defined Oiling Profiles

As said in 'Adjusting the Oiling Settings Manually' on page 33, you can choose the oiling settings in the same way as you would choose a station with a radio: either manually or via the pre-set buttons. Adjusting the pre-defined oiling profiles would then be equivalent to storing the frequencies in the pre-set buttons.

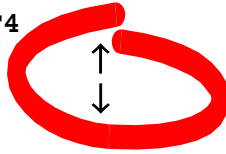
Adjusting the pre-defined oiling profiles is done in the same way as adjusting the oiling profile itself (see 'Adjusting the Oiling Settings Manually' on page 33). As an example, consider adjusting the total distance in pre-defined oiling profile for Recreational Bowling.

```

Recreational Bowling
* Total Distance:
  35 feet
<-          -> Back

```

F1 F2 F3 F4



From the main menu, select **Special**, scroll to **Change profiles** (F1/F3), press *Select* (F2), scroll to **Recreational Bowling** (F1/F3), press *Select* (F2), then scroll to **Total Distance** (F1/F3). The current setting is shown; use the up and down keys on the right hand side of the keyboard to adjust the value between 30 and 45 feet. Press *Back* (F4) three times to return to the main menu.



Note that when a pre-defined oiling profile is changed, the current oiling settings will not be updated until the pre-defined oiling profile is activated (see 'Pre-defined Oiling Profiles' on page 29).

Restoring the Pre-defined Oiling Profiles to their Factory-default Values

The factory-defaults of the pre-defined oiling profiles are given in 'Pre-defined Oiling Profiles' on page 29. If, after changing the pre-defined oiling profiles, you want to restore them to these values, select **Special** from the main menu, scroll to **Change profiles** (F1/F3), press *Select* (F2), scroll to **Back to Factory Settings** (F1/F3) and press *Select* (F2). Confirm your choice by pressing F2 or cancel by pressing F4.

```

Change Profiles
* Back to Factory
  Settings
<- Select -> Back

```

F1 F2 F3 F4

MAINTENANCE

CLEANING THE CABINET

Clean the cabinet, panel and controls regularly with a soft cloth lightly moistened with a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol, thinner, benzene or acetone, because this will damage the cabinet surface.



Attention! Unplug the machine from the wall outlet before cleaning it!

CLEANING THE SPRAYING COMPARTMENT

Once a month, clean the inside of the spraying compartment using a dry cloth.

CLEANING THE EQUALIZER BRUSH

Daily clean the equalizer brush[®] attached to the bottom of the machine. Remove remaining dust, moist and fluid from the brush with a soft cloth.



Clean equalizer brush

TROUBLE CHECKS

The following trouble checks will help you correct the most common problems encountered with the Lane Liner machine. Should any problem persist after you have made these checks, consult your nearest LEVAB dealer.

Before proceeding with these trouble checks, first check if the power supply cord is firmly connected to a live power outlet.

Oil is deposited on places where there should be no oil (e.g. on the pin deck).

Make sure that the **velvet strips do not touch the lane**. Oil will be deposited where they touch the lane. Cut away pieces of the strips that touch the lane. Better is to **replace** the velvet strips.

The machine is not aligned to the bowling lane.

Check if the machine is mounted correctly on the lane. The flanges of the side wheels should fall into the gutters. If this is the case, there is no problem; the machine will function normally.

While transferring the machine from lane to lane, it leaves a few drops of oil on the approach.

- Solution: after transferring the machine onto a lane, roll it approx. 30 cm. onto the lane, then shake the machine a few times (pull the handle bar up and down). Then roll the machine back to the foul line to start the lane treatment. In this way, build-up of oil in the spraying compartment is prevented.
- Replace the velvet strips around the spraying compartment if these are soaked with oil, or squeeze excess oil out of the velvet strips with a rag.



Directly after the machine is switched on, the start indicator ③, the error indicator ④ or both do not light continuously for 3 seconds.

There are two possibilities:

- The start-indicator ③ is flashing: while conditioning the lane the power was cut off. For more information see below at "After power up the start indicator ③ is flashing".
- One or more lights are defective. Replace the broken bulb (component no. 1422, can be ordered from your LEVAB dealer or directly from Levab International).

The error indicator ④ is shining continuously.

The level of the oil in the internal oil tank is running low. As soon as this happens another approx. 10 lanes can be treated; as long as the start indicator ③ is on at least one lane can be treated. If the start indicator ③ goes off, the machine will not respond to the start button ⑤ until oil has been supplied.

Turn off the power and re-fill the oil. For further instructions see 'Supplying Oil' on page 17.

The error indicator ④ is blinking (once a second a short blink: | | |).

A problem has been detected. The machine is *not broken*; it will *continue to operate*.

There can be various causes:

- The battery of the built-in computer has run out. The battery has a service life of at least 5 years.
- The air pressure is not building up; there is possibly a leak in one of the air tubes.

The problem cause is displayed on the first two lines of the built-in LCD display unit. Another possibility to read the problem case is to connect your MS-Windows PC (laptop or notebook), or on your Palm Pilot handheld, and run the 'Liner Panel'/'Palm Panel' software. Upon connection, the software will immediately analyse the situation and display the most probable cause.

If the battery has run out, the error indicator ④ will start to flash about 30 days before the battery fails. The machine will continue to work until the battery fails completely. Please contact your LEVAB dealer to have the battery replaced. A new battery (component no. 1433) can be ordered from your LEVAB dealer or directly from Levab International.

If the air pressure is not building up, the Lane Liner will keep on running as normal. The pattern of the applied oil might, however, be severely distorted.

After power up the start indicator ③ is flashing.

While conditioning the lane the power supply was cut off (for example because the power cord was jammed and has pulled the plug from the connector). The last position on the lane is kept in memory; to resume the conditioning session, roll back the machine 20-30 cm and then briefly press the start button ⑤. To abort the session, hold down the start button ⑤ for approx. 4 seconds until the air pump switches off.

During a conditioning session the machine stops running, but the start indicator ③ keeps on flashing.


The machine has been jammed and the built-in jamming protection has switched off the drive motor. To resume the conditioning session, remove the obstruction, roll back the machine 20-30 cm and briefly press the start button ⑤. To abort the session, hold down the start button ⑤ for approx. 4 seconds until the air pump switches off.

SPECIFICATIONS

GENERAL CHARACTERISTICS

Power Supply	220-240 V AC, 50/60 Hz.
Power Consumption	Approx. 1100 Watts during full operation, 15 Watts in stand-by mode
Dimensions, including projecting parts and controls	approx. 1250 x 274 x 765 mm (49¼ x 11¼ x 30 inches) (W/H/D).
Ambient temperature range	5°C to 35°C
Ambient air humidity range	60% to 95%
Weight	130 kg
Supplied Accessories	Power Supply Cord. 1 bar pressure gauge. Operating instructions.

TECHNICAL DATA

Application System	Direct Spray Application  ™ by means of multiple independently operating air atomizing spray nozzles.
Control Mechanism	PLC, self-calibrating system, closed-loop control algorithm with automatic torque correction.
Drive system	Rotary-current motor with variable speed, chain transmission.
Oiling Range	30 – 45 feet (9.14 – 13.71 m) adjustable. 10 – 20 feet (3.05 – 6.10 m) for short-run program.
Oil Distribution	Foul line: 10 - 80 units adjustable. Gradually decreasing to approx. 8 units at the end of the oiled stretch.

Total Session Time	approx. 40 sec. per lane, average. Oiling and stripping in separate runs: approx. 90 sec. per lane, average.
Protection	Automatic jamming and collision detection. Continuous oil level monitoring. Air pressure monitoring.

Design and specifications are subject to change without notice in the course of product improvement.

PERIODIC CHECKS

The following check list can help keep your Lane Liner in optimal condition. Keep this list in an obvious place near the machine.

AT DELIVERY

1. Adjust the power of the mist extractor unit (see page 25).

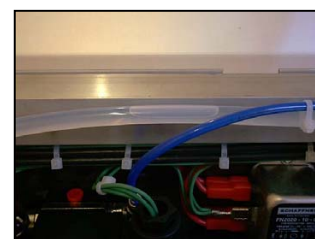
DAILY

1. Clean the Equalizer Brush[®] (see page 38).



MONTHLY

1. Make sure there are no air bubbles in the oil tubes (see also 'Draining Air from the Oil Tubes' on page 23).
2. Clean the inside of the spraying compartment.



ONCE A YEAR

1. Adjust the power of the mist extractor unit (see page 25).
2. Replace the equalizer brush[®] (component no. 1131).
3. Replace the oil filter in the control compartment (component no. 1241), then drain the air from the oil tubes (see page 23).
4. Clean or replace the air filter[®].



NEVER

1. Never clean the liquid and air orifices in the oil spray nozzles (see page 26).

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EC DECLARATION OF CONFORMITY FOR MACHINERY

(Directive 98/37/EC, annex II, point A)

Name of manufacturer:	Levab International
Address of manufacturer:	Industrieterrein Oosterzij 3 1851 NV Heiloo The Netherlands

declares that the product
'Lane Liner',

types

- 'bowling lane conditioning machine', and
- 'bowling lane conditioning machine combined with stripper',

serial numbers XX03XXX

comply to the conditions of the machine directive (Directive
98/37/EG).

Signed in Bergen (Noord Holland), The Netherlands, on the 23rd of
January 2000.

ir. E.N.M. Tromp
Designer/Engineer