

**OPERATORS MANUAL
FOR
LH 1600M TRAM LINE MONITOR**

LH No. 020-153-UK Vers. 1.00

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INTRODUCTION

We have endeavoured to deliver a fault free product. To ensure optimal use of the equipment we ask that great attention be paid when reading the manual. We are more than happy to help should any queries arise, both when the product is used for the first time and at any later date. Regarding responsibility for use of the product we refer to our sales and delivery terms especially paragraph 7, which follows:

7. Product usage.

7.1 Any use of the product is at the sole risk of the buyer. The buyer is therefore not entitled to any form for compensation caused by, for example, any of the following:

- Disturbance to/from any electronic services or products that do not confirm to the standards for CE marking,
- Missing or poor signal coverage or a succession hereof from external transmitters/receivers, used by the buyer,
- Functional faults, which apply to or from a PC-program or PC-equipment, not delivered by the seller,
- Faults that may arise from the buyers negligence to react to warnings and fault messages from the product, or which can be traced to negligence and/or absent constant control of the work carried out in comparison to the planned job.

7.2 When implementing any new equipment the buyer must take great care and pay attention. Any doubts as to correct operation/use should result in contacting the sellers service department.

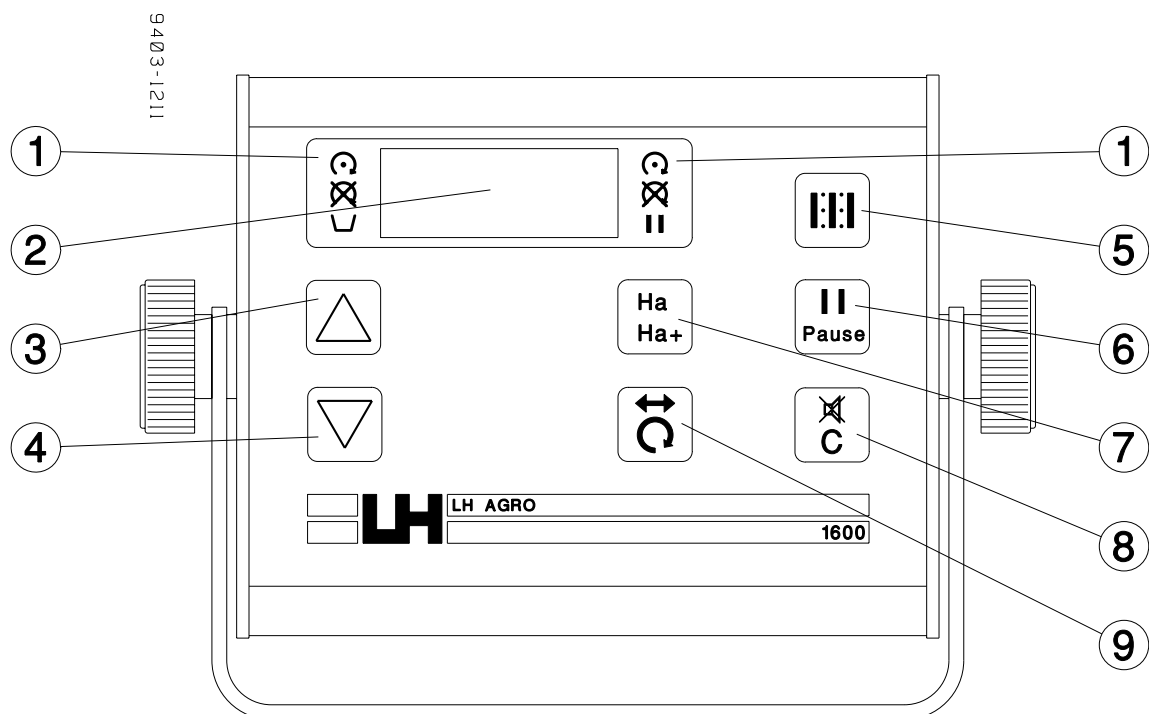
This manual may not be altered, copied or manipulated in any way. Unoriginal manuals can lead to operational faults damaging machines or crops as a consequence thereof. LH Agro can therefore not be held responsible for damages incurred which can be traced to the use of unoriginal or manipulated manuals. Original manuals can be requisitioned at any time from LH Agro (UK) Ltd.

GENERAL USE

The LH 1600M is a user-friendly unit, which is able to control and monitor the following:

1. **Tramlining.**
2. **Area trip and total monitoring.**
3. **RPM control for the metering shaft.**
4. **RPM control for the fan.**
5. **Empty hopper level warning.**

THE MONITOR



Pos.	Function
1	Warning indication for metering shaft, fan, empty hopper and hold function.
2	4 digit display.
3	Count up of actual track and encode value increase.
4	Count down of actual track and encode value decrease.
5	Tramline: Setting the tramline intervals.
6	Hold-function: Locks the system for actual tramline counting.
7	Area trip and area total counter. Counts area in Ha.
8	Clear key: Used to cancel the warning sound and for resetting encoded/metered values in the monitor.
9	Working width, wheel circumference, fan warning and metering shaft warning.

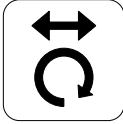
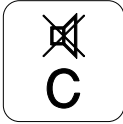
USING THE TRAMLINE MONITOR

Before the LH 1600M tramline monitor can be used, the following values must be encoded:

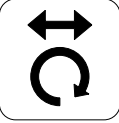
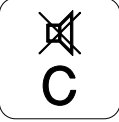
1. Working width.
2. Wheel circumference.
3. Minimum RPM for fan warning (if RPM sensor is fitted).
4. Rpm warning for metering shaft
5. Tramline method and interval

The following encodements are described in the following, point for point:

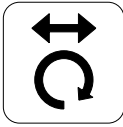
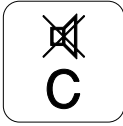
1. WORKING WIDTH ENCODEMENT

Key	Function
	Pressing this key displays encodement 1, the working width. A new working width can be encoded using the up/down keys. NOTE! The working width is encoded in centimetres allowing for any overlap.
	Pressing this key deletes/resets the working width.

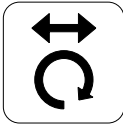
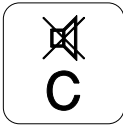
2. WHEEL CIRCUMFERENCE ENCODEMENT

Key	Function
	<p>Pressing this key for approx. 2 seconds displays encodement 2, the wheel circumference.</p> <p>The up/down keys alter the value.</p> <p>The wheel circumference is determined thus:</p> <p>MANUAL SPEED SENSOR CALIBRATION</p> <ol style="list-style-type: none"> 1. Mark the field and the wheel. 2. Drive minimum 10 revolutions with the wheel. 3. Mark the field. 4. Measure the distance between the 2 marks and divide this figure by 10. The result is the effective wheel circumference. 5. Divide the effective wheel circumference by the number of magnets.
	<p>AUTOMATIC SPEED SENSOR CALIBRATION</p> <ol style="list-style-type: none"> 1. Measure a 100 metre stretch in the field 2. Drive to the start mark 3. Press the "clear" key for 3 seconds under the encodement menu for the speed sensor and the wheel circumference will be cleared. Two horizontal lines appear on the display and the monitor is now ready for automation speed sensor calibration. 4. Drive the 100-metre stretch, stopping at the stop mark. Note that the monitor counts the number of pulses received from the speed sensor. 5. Press the "encode" key and the new wheel circumference is calculated. 6. Press the "encode" key once more to go to encodement 3. 7. The automatic speed sensor calibration procedure is now finished. <p>NOTE! "ERR" will be displayed if the monitor has not received enough pulses from the speed sensor.</p>
	<p>Pressing this key deletes/resets the wheel circumference.</p>

3. RPM WARNING FOR FAN SPEED

Key	Function
	Pressing this key for 2 seconds displays encodement 3, the minimum fan speed warning. This warning is given if the fan RPM falls to lower than the encoded minimum RPM. Using the up/down keys alters the encoded value.
	Pressing this key switches the warning off if no RPM sensor is fitted.

4. RPM WARNING FOR METERING SHAFT

Key	Function
	Pressing this key for 2 seconds displays encodement 4, metering shaft warning ON or OFF. Using the up/down keys switches between ON and OFF.
	Pressing this key switches the warning OFF if no shaft sensor is fitted.

5. TRAMLINE METHOD

The monitor offers two different tramlining methods; one of these must be selected before drilling commences.

UNEVEN METHOD

If the working width of the drill is divisible by the working width of the sprayer/fertiliser distributor with an uneven figure, 3, 5, 7, or 9, you **must** select the **UNEVEN METHOD**.

Example:

Sprayer	Drill	Bout no. (interval)
12 M	4 M	3

See Fig. 1

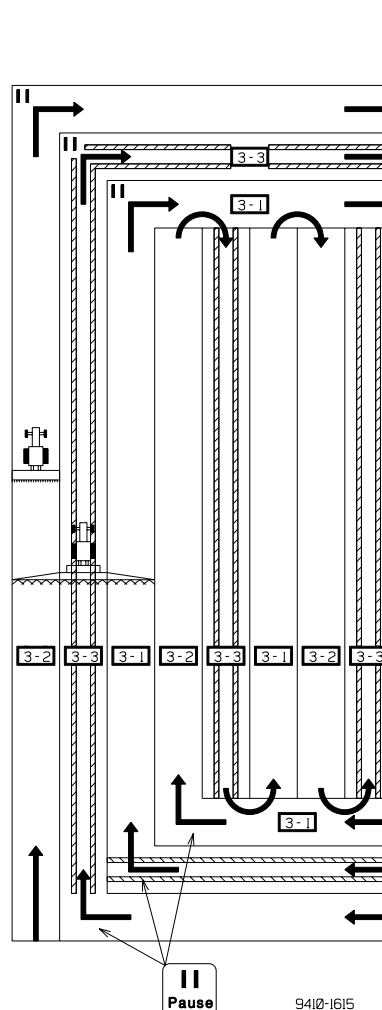
In this example, a bout number (tramline rhythm) of 3 is encoded. Tramlines are made when the actual bout number is equal to the encoded bout number.

The actual track is counted each time the drill is raised.

Be aware when and especially when tramlines are not to be counted.

Bout counting can be controlled using the "HOLD" key or the "UP/DOWN" keys.

Fig. 1



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EVEN METHOD

If the working width of the drill is divisible by the working width of the sprayer/spreader with an even figure 2, 4, 6, or 8, you **must** select the **EVEN METHOD**.

Example:

Sprayer	Drill	Bout no. (interval)
12 M	3 M	4

See fig. 2

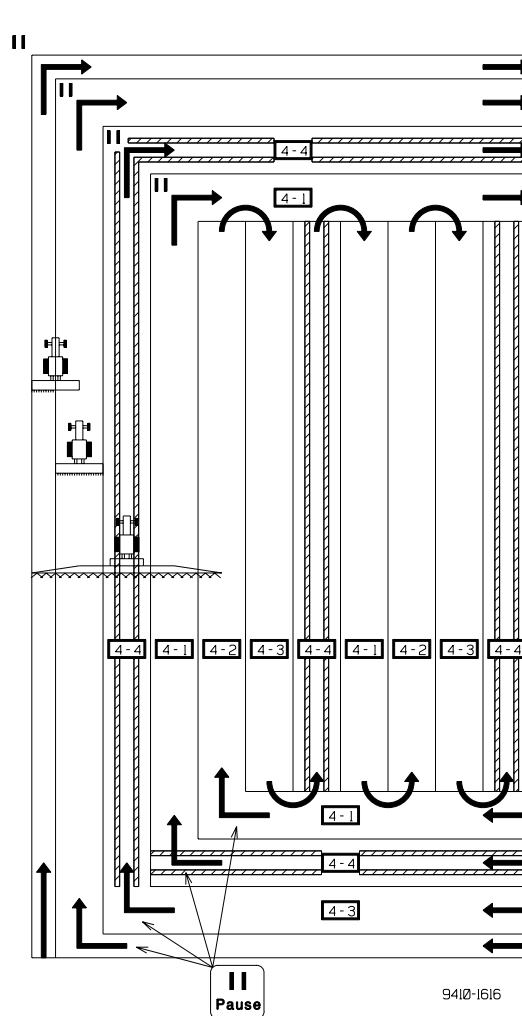
In this example a bout number (tramline rhythm) of 4 is encoded.

This, however, will give a disadvantage, as the first bout around the field has to be driven with half the drill closed. When this has been done there will be no problems. Tramlines are made every fourth time the drill is lowered.


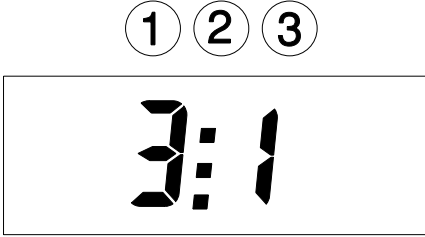
Be aware when and especially when tramlines are not to be counted.

Bout counting can be controlled using the "HOLD" key or the "UP/DOWN" keys.


Fig.2




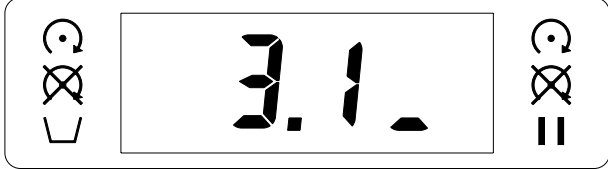
TRAMLINING FUNCTION AND TRACK NUMBER ENCODEMENT

Key	Function
	<p>Pressing this key displays the actual bout number and the encoded bout number (the interval at which the tramlines are to be made).</p> <p>The actual bout number is increased by one each time the drill is raised. When the actual bout number is equal to the encoded bout number, tramlines are automatically made.</p> <p>Next time the drill is raised, the actual bout number changes to 1.</p> <div style="text-align: center;">  </div> <p>Display</p> <ol style="list-style-type: none"> 1. Encoded bout number. 2. Indication for activated tramlining. 3. Actual bout number.


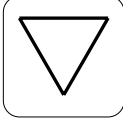
BOUT NUMBER ENCODEMENT

Key	Function
	<p>Pressing this key for approx. 2 seconds increases the encoded bout number by one.</p> <p>If further bouts are to be counted the key must be reactivated for about 2 seconds.</p> <p>This can be continued until the encoded bout number is equal to 9 after which it changes to 1.</p>

HOLD FUNCTION

Key	Function
 <p>Pause</p>	<p>Pressing this key effectively locks the actual bout number, i.e. the drill can be raised without increasing the track number and the present tramlining state remains unchanged.</p> <p>The hold status is displayed. When the dash next to the hold symbol is lit the hold function is activated:</p> <div style="text-align: center;">  </div> <p>The hold function can be cancelled by pressing the key again.</p>

MANUAL UP/DOWN ACTUAL BOUT COUNTING

Key	Function
 	<p>Manual up/down counting of the actual bout number can only take place when the tramline function is selected.</p> <p>This function can be used if the drill has been raised in the middle of a bout, when actual bout counting is not required.</p> <p>The up or down key should be pressed for approx. 2 seconds and the actual bout number is increased or reduced.</p>

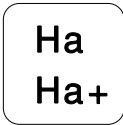
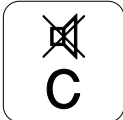
AREA TRIP AND AREA TOTAL

The area trip and the area total counters are on the same key in the LH 1600M.

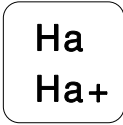
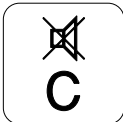
The first time the key is pressed the area trip counter is displayed as this is the counter most regularly used.

Pressing the key for approx. 2 seconds displays the area total counter.

AREA TRIP COUNTER

Key	Function
	<p>Pressing this key displays the worked area in ha. The area is shown with 2 decimals from 0 - 99.99 ha and thereafter with 1 decimal from 100.0 - 999.9 ha. and without decimals from 1000 – 9999 ha.</p> <p>Area counting is started and stopped by the implement sensor so that area is only counted when the drill is in the working position.</p>
	<p>Pressing this key for approx. 2 seconds resets the area trip counter.</p>

AREA TOTAL COUNTER

Key	Function
	<p>Pressing and holding this key for approx. 2 seconds displays the total area in ha.</p> <p>The area is shown with 2 decimals from 0 - 99.99 ha and thereafter with 1 decimal from 100.0 - 999.9 ha. and without decimals from 1000 – 9999 ha.</p> <p>This function is used to sum up the worked area for a season or a year.</p> <p>The area total counter counts synchronously with the area trip counter.</p> <p>Pressing this key again returns to the area trip counter.</p> <p>NOTE! If the bout number changes or if a warning is given, the monitor will automatically display the tramlining function.</p>
	<p>Pressing this key for approx. 2 seconds resets the area total counter.</p>

WARNING FUNCTION


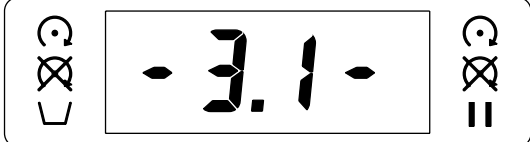
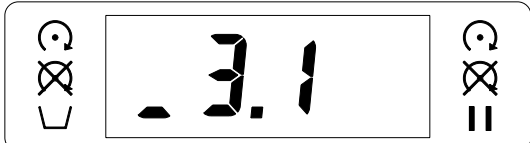
The LH 1600M is equipped with a warning function for fan speed, metering shaft rotation and for an empty hopper.

Warnings are given by an indication on the display and an audible signal.

The warning signal can be cancelled by pressing the "C" key.

The warning indication will disappear only when the system is running correctly again.

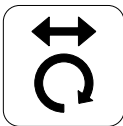

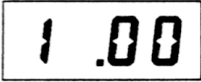
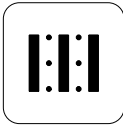
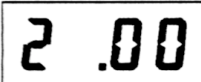
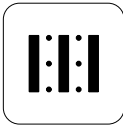
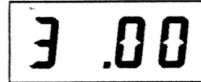

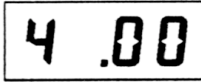

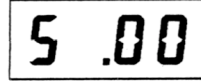
WARNING CONDITIONS

Display	Description
	Fan speed warning. This warning is given if the fan speed falls to lower than the encoded minimum fan speed.
	Warning for stopped metering shaft.
	Warning for empty hopper.

TESTING SENSORS

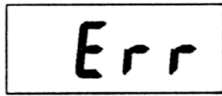
If it is suspected that a sensor is not functioning, as it should; the entire system can be checked as follows:

The LH 1600M TEST is selected thus:

Key	Function
	Encode the working width to 25 and activate the tramline function.
	 <p>Is displayed.</p> <p>1 indicates that the first sensor is being tested. Sensor no. 1 is the fan RPM sensor.</p> <p>0 is a counter that counts from 0-99. One is counted each time the sensor is activated.</p> <p>The dot indicates if the sensor is active or not.</p> <p>When a dot appears, the sensor is active.</p>
	<p>Press the key again; and sensor no. 2 can be tested.</p>  <p>Is displayed.</p> <p>Sensor no. 2, metering shaft RPM sensor, is ready for testing.</p>
	<p>Press the key again; and sensor no. 3 can be tested.</p>  <p>Is displayed.</p> <p>Sensor no. 3, implement sensor, is ready for testing.</p>
	<p>Press the key again; and sensor no. 4 can be tested.</p>  <p>Is displayed.</p> <p>Sensor no. 4, hopper sensor, is ready for testing.</p>
	<p>Press the key again; and sensor no. 5 can be tested.</p>  <p>Is displayed.</p> <p>Sensor no. 5, speed sensor, is ready for testing.</p>

ERROR INDICATION

To ensure correct operation the LH 1600M has a built in error indication:



If your LH 1600M displays this error indication, it is due to the supply voltage to the monitor being too low. Check the supply cables (+ and -).