

**OPERATORS MANUAL
FOR THE
LH 4000 SPRAYER MONITOR**

LH No. 020-183-UK Version 1.05

LH Technologies Denmark ApS

Mølhavevej 2
9440 Aabybro
Denmark

Tel. +45 9696 2500

Fax. +45 9696 2501

Internet: <http://www.lh-agro.com/>

Contents

INTRODUCTION	5
GENERAL USE	6
BEFORE USE	6
TRACTOR-INFO	6
CONTRAST	7
MEMORY-KEY	7
TANK-FILL CONTROL	7
CLEAR-KEY	7
SCREEN LIGHT	7
NUMERIC KEYS	7
THE DISPLAY	8
BASIC "MENU"-SCREEN	8
"STATUS" SCREEN	9
SPRAY-PROGRAM	9
SPRAYER, OPERATION	10
PRE-DEFINED FUNCTIONS	10
DOSAGE (APPLICATION)	10
SPRAY-BOOM INDICATOR STATUS	10
SPEED	10
OPERATOR SELECTABLE FUNCTIONS	11
TRACTOR FUNCTIONS	11
SPRAY FUNCTIONS	12
AREA FUNCTIONS	14
TIME FUNCTIONS	14
SPRAY ENCODEMENTS	15
DOSERATE	15
DO'S AND DON'TS	15
STEP %	16
LITRE LEFT	16
HA LEFT	16
FLOW-FIGURE	16
FLOW CALIBRATION	16
BOOM WIDTH	17
DRIVE FACTOR	17
REGULATION DELAY	17
UNIFORM PRESSURE	18
SPEED SENSOR (WHEEL TRACTOR, WHEEL SPRAYER)	18
WHEEL TRACTOR	18
WHEEL SPRAYER	18
SPEED SENSOR CALIBRATION	18
TANK VOLUME	19
METRE SWITCH	20
INPUT SET-UP	20
RPM SENSOR	20
WARNING ENCODE	20

DATE-CLOCK	20
SPRAYER - DATA DELETE	21
LOG BOOK.....	22
THE "LOG-BOOK", HOW TO USE THIS FEATURE.....	22
START TASK.....	23
END TASK	24
SEE TASK.....	25
DELETE TASK.....	25
EXITING "TASK-MODE"	25
TANK FILL FEATURE	26
FILL-FLOWMETER CALIBRATION	27
OTHER IMPLEMENT	28
OTHER IMPLEMENT, OPERATION	29
SELECTABLE FUNCTIONS	29
TRACTOR FUNCTIONS.....	29
AREA FUNCTIONS	30
TIME FUNCTIONS.....	30
OTHER IMPLEMENT, ENCODE	31
HA LEFT.....	31
WORKING WIDTH	31
SPEED SENSOR. (WHEEL TRACTOR, WHEEL IMPLEMENT).....	32
WHEEL-TRACTOR.....	32
WHEEL IMPLEMENT	32
SPEED SENSOR CALIBRATION	32
IMPLEMENT SENSOR	32
METRE-SWITCH	32
WARNING ENCODE.....	32
DATE/CLOCK	32
OTHER IMPLEMENT-DATA/DELETE.....	33
LOG-BOOK.....	34
THE "LOG-BOOK", HOW TO USE THIS FACILITY	34
START TASK.....	35
END TASK	36
SEE TASK.....	37
DELETE TASK.....	37
LEAVING "TASK-MODE"	37
SYSTEM MENU	38
TEST INPUT	39
TEST OUTPUT	40
SPEED SIMULATION	40
SYSTEM DATA	40
ERROR-MESSAGES.....	41
VOLTAGE WARNING	41
WARNING OUTPUT	41
MEMORY-FAILURE.....	41
MACHINE SETTING CHART	42
NOTES	43

INTRODUCTION

Congratulations with your new **LH 4000** Spray Controller!

The product is a specifically developed spray controller based on the latest available technology. We are confident that it will serve you to your full satisfaction in the years to come.

The computer provides you with a comprehensive selection of valuable information's not only when spraying, but in conjunction with all field work where its facilities for speed and area recording etc. may be desired.

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.

GENERAL USE

The **LH 4000** is (specifically) designed for crop sprayer control.

The software design is consequently designed for easy use and access for the operator in conjunction with spray work.

The computer communicates with you through the screen in clear language. Minimum use of this manual is therefore required.

BEFORE USE

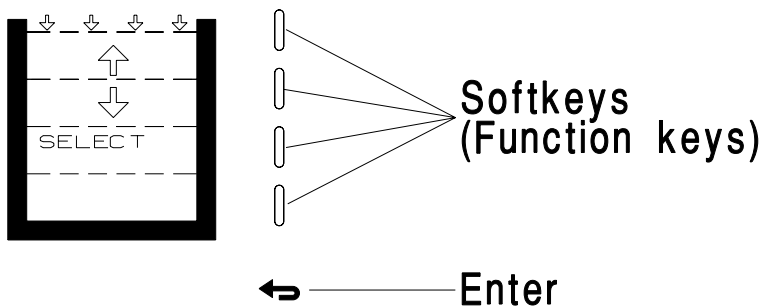
It is essential that you make yourself familiar with the keys and their use. Please read carefully and study the following pages.

Unfold the back page, which shows the fascia of the computer.

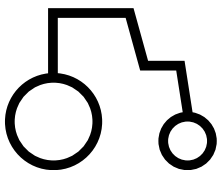
You communicate with the computer using only 5 keys.

You will appreciate that the screens relating to the four upper function- keys (softkeys) change, as you proceed.

The screen shows the present significance of each individual key. The lower "enter/return-key" allows you to return to the previous screen.

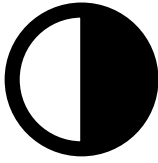


TRACTOR-INFO



This key instantly displays:

- ACTUAL SPEED**
- WORK EFFICIENCY**
- AREA WORKED**
- REMAINING AREA**

CONTRAST

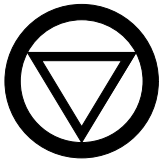
Adjustment of screen contrast. Can be useful when working under dark or sunny conditions.

NOTE! The screen may go dark in extreme hot or cold conditions. The display will return to normal when the working temperature of the monitor is back to normal.

To adjust the screen contrast; Use the +/- keys.

MEMORY-KEY

If you want an instant return to any screen, press this key before you scroll to another screen. The memo-key allows for instant return to the memorised screen.

TANK-FILL CONTROL

This key activates the "FILL" feature, which is detailed later in this manual.

CLEAR-KEY

Only active in conjunction with encoding. Will erase any incorrectly entered figure.

SCREEN LIGHT

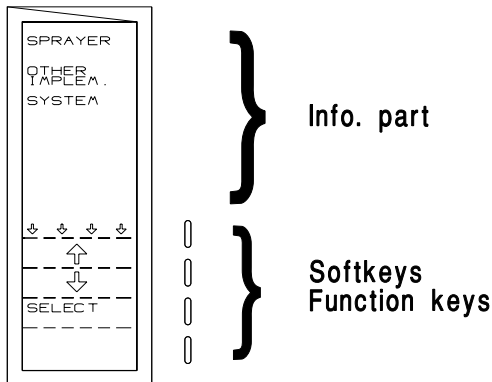
Switches the back-light on and off.

NUMERIC KEYS

Only active when encoding values, or when simulating forward speed.

THE DISPLAY

The screen is divided in two sections. The upper section is the information screen. The lower relates to the softkeys.

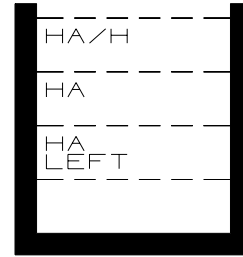
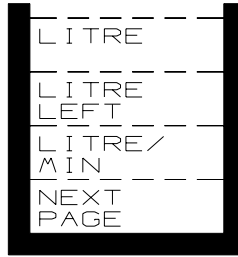
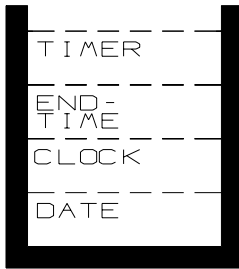


THE INFO-SCREEN:

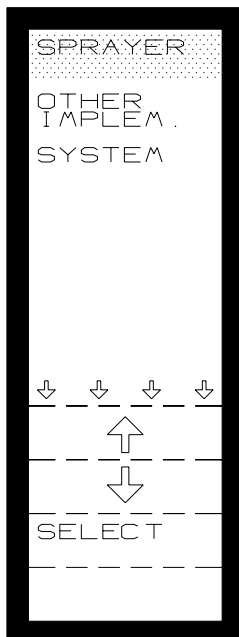
You will appreciate the information screen is designed by the manufacturer and cannot be altered by you.

THE LOWER (SOFTKEY) FUNCTION-SCREEN:

The actual significance of the four keys is displayed. You will notice that this status changes as you proceed. (see the following examples)



BASIC "MENU"-SCREEN



When powered up, the screen will light up and display the "main menu". Should you have selected another screen, press the return-key until the "main menu" is displayed again:

SPRAYER

OTHER IMPLEMENT

SYSTEM

The "cursor" can be moved up & down using the softkeys. Place the cursor on the function you require and press **"SELECT"**.

IMPORTANT! IMPORTANT! IMPORTANT!

The software program does not allow menu changes whilst the machine is moving. This is to prevent operator mistakes and incorrect recordings.

"STATUS" SCREEN

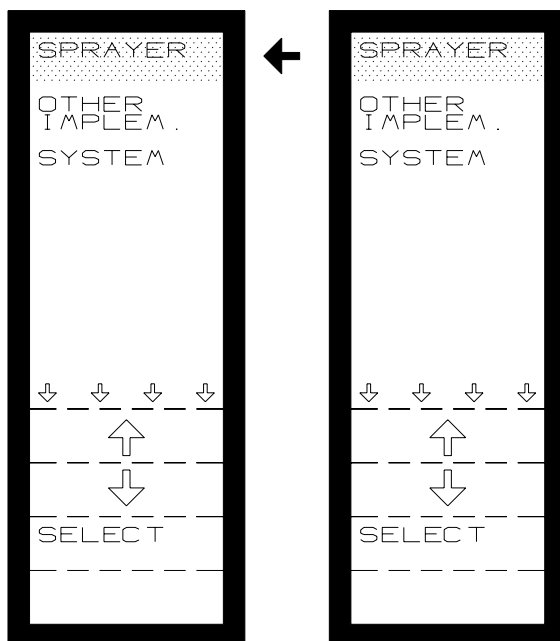
Any time the "operation-menu" is selected, or you leave any encode menu, the status screen will appear. Here all the current encoded values will be shown.

CHECK & ACCEPT the values before proceeding, by pressing the enter/return-key.

NOTE! Before start remember to cancel (reset) all relevant counters. (Area-litre etc.) using the **"DATA/DELETE"** function, if required.

SPRAY-PROGRAM

From the basic menu, select sprayer:



Move cursor to **"SPRAY-PROGRAM"**.
Press **"SELECT"**.
From there you can choose:

OPERATION

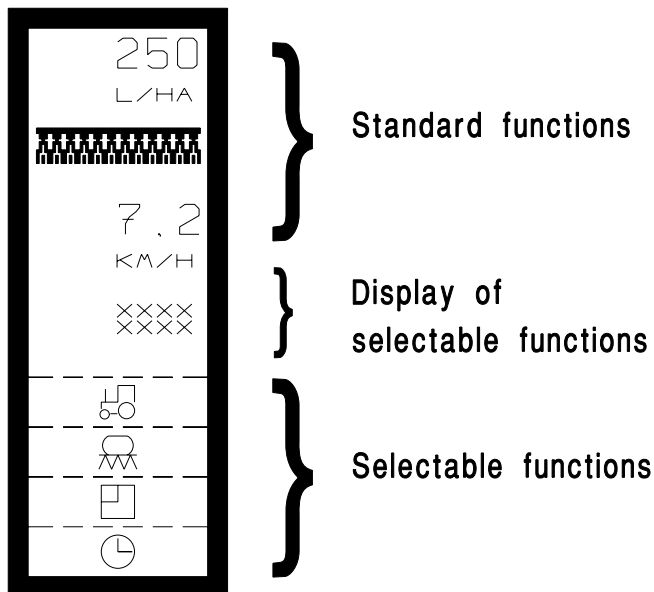
ENCODE

DATA DELETE

LOG BOOK

SPRAYER, OPERATION

Two "Status screens" must be accepted. Press the "Return-key" until the following screen is displayed



PRE-DEFINED FUNCTIONS

DOSAGE (APPLICATION)

The primary function under sprayer is dosage. The dosage (application rate) is shown in Litres per Hectare, calculated as a result of the flow through the flowmeter, the speed and the recorded area. Subsequently no reading will show if the machine is stationary, or if there is no flow through the flowmeter.

Two arrows in the upper left corner of screen indicate the length and status of control signals to the pressure regulator.

NOTE! The shown application rate (L/Ha) is dependent of a correct calibration of wheel/ circumference/flow-figure/working width. (Details later in this manual).

SPRAY-BOOM INDICATOR STATUS

The number and position of active/inactive boom-sections is shown on the screen.

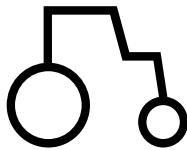
SPEED

The forward speed is displayed in km/h. (One decimal).

NOTE! Ensure you select the correct sensor. (Wheel tractor, Wheel sprayer)
Radar is not available!

OPERATOR SELECTABLE FUNCTIONS

TRACTOR FUNCTIONS



METRE IN TRACK:	The distance recorded in the current track (tramline).
METRE:	Recorded total metres
METRE START/ METRE STOP:	Manual start/stop of distance counter.
BATT.:	Battery voltage

METRE IN TRACK:

The distance recorded in current track. You may use this function to locate a position in the track (e.g. the spot where the tank ran empty).

This function is related to the **"REDUCE TRA. M."** (This function is only visible whilst the sprayer is inactive.)

The **"METRE IN TRACK"**-counter is reset to **NIL**, each time the sprayer is shut (e.g. at headlands).

However, should you shut the sprayer in a track, the computer memorises the distance driven! And displays **"REDUCE TRA. M."**

NOTE! Should you stop spraying at a position you would like to relocate, (E.g. if you need to refill your tank) Proceed thus:

After refilling your tank drive to start of track (headland border). Press **"REDUCE TRA. M"** and drive along the tramline. An audible and visual warning will be given 5 metres before the location at which the tank ran empty.

When the position is instruction is given to start spraying.

METRE.:

The total distance driven in metres.

This is measured with the wheel with the speed sensor fitted. You may choose "manual" start/stop of counter. Or automatically via the override sensor (sprayer main valve) switch. Select your mode in: **"ENCODE" "METRE SWITCH"**.

or:

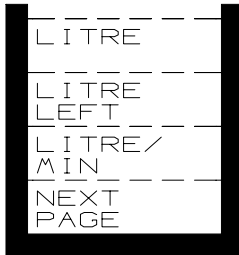
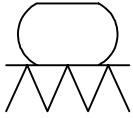
METRE START/ METRE STOP:

Manual Start/Stop of metre counter. The start/stop selection screen will only appear if **"MANUAL"** has been selected in **"ENCODE"**.

BATT.:

The current voltage of battery.

SPRAY FUNCTIONS



LITRE: Amount consumed from tank.

LITRE LEFT: Amount remaining in tank.

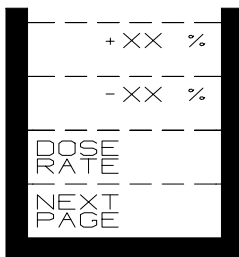
LITRE/MIN.: Litre consumption per minute.

LITRE: The total amount consumed since counter was reset. This function is a "trip-counter", which may be reset using the **"DATA/DELETE"** function. The "grand total" counter is also available in this menu.

LITRE LEFT: The amount of liquid in tank. However, this feature requires encoding the tank volume/amount filled, before starting. This is done in encode **"LITRE LEFT"**. This value is automatically entered is the optional tank fill feature is used.

LITRE/MIN.: The actual flow in Litres per minute through the flowmeter. Do not regard this as the Pump-capacity.

Pressing the **"NEXT PAGE"** key displays the next functions.



+xx %: Increase of application rate.

-xx %: Decrease of application rate.

**DOSE-RATE/
NORMAL:** Encodement of application rate, OR instant return to normal rate (+/- % activation)

+ xx %: Percentile increase of the application rate. You select the percent figure you require, in encode **"STEP%"**

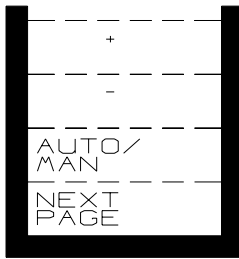
- xx %: Percent decrease of application rate. (similar figure will be entered automatically, ref. the above).

**NORMAL/
DOSAGE:** Multifunctional softkey.

It will read **"DOSE-RATE"** normally. Select, and you will have instant access to enter or alter your desired application rate.

However, should you have activated either your **"+"** or **"-"** %-keys, the softkey will read **"NORMAL"**. Subsequently, pressing this key will return your application rate to "normal" regardless what over/under rate you are currently applying.

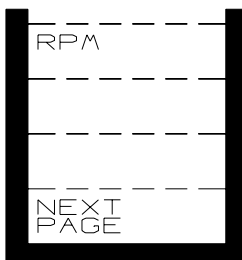
Pressing the "**NEXT PAGE**" key displays the next functions.



- +:** Manual increase of pressure (application).
- :** Manual decrease of pressure (application).
- AUTO/MAN:** Select automatic or manual application control. (+/- keys will appear when you select manual-mode
This facility may be used e.g. under severe field conditions where automatic (computer control) is inefficient, or you have observed abnormalities in the computer control mode.

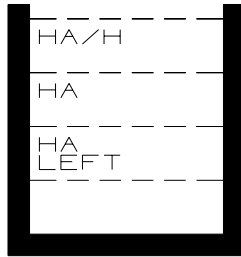
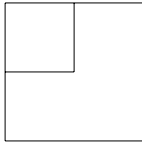
NOTE! Be aware. Should you have selected "**MANUAL**" mode is the computer unable to resume to control before you reset to "**AUTOMATIC**" control mode

Pressing the "**NEXT PAGE**" key displays the next functions.



- RPM:** Shaft speed of an axle (only displayed if **RPM ON** is selected in encode).

AREA FUNCTIONS



HA/H: Work efficiency.

HA: Area worked.

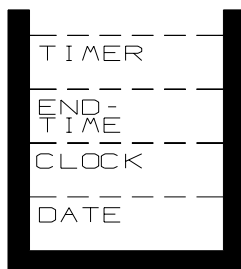
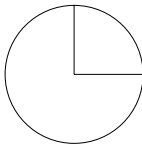
HA LEFT: Remaining area.

HA/H: Work efficiency. The actual area capacity per hour.

HA: Area counter. The recorded area worked since reset of counter. May be reset in the **"DATA/DELETE"** menu. This is also where you will find the "Grand Total Area counter"

HA LEFT: Remaining area to work. This function requires encodement of actual size of the area in encode **"HA LEFT"**.

TIME FUNCTIONS



TIMER: Work hours/minutes.

END TIME: Expected time of finalisation.

CLOCK: Actual time.

DATE: Day-month-year

TIMER: Records the work time on a specific job. You start and stop this recorder manually. May be reset in menu **"DATA/DELETE"**, where the "Total time" recorder is also available.

END TIME: Expected time of day at which the job will be complete. Requires field size to be entered in encode **"HA LEFT"**.

CLOCK: Actual time. Time is adjusted in **"ENCODE"**.

DATE: The actual date. The date is adjusted in **"ENCODE"**.

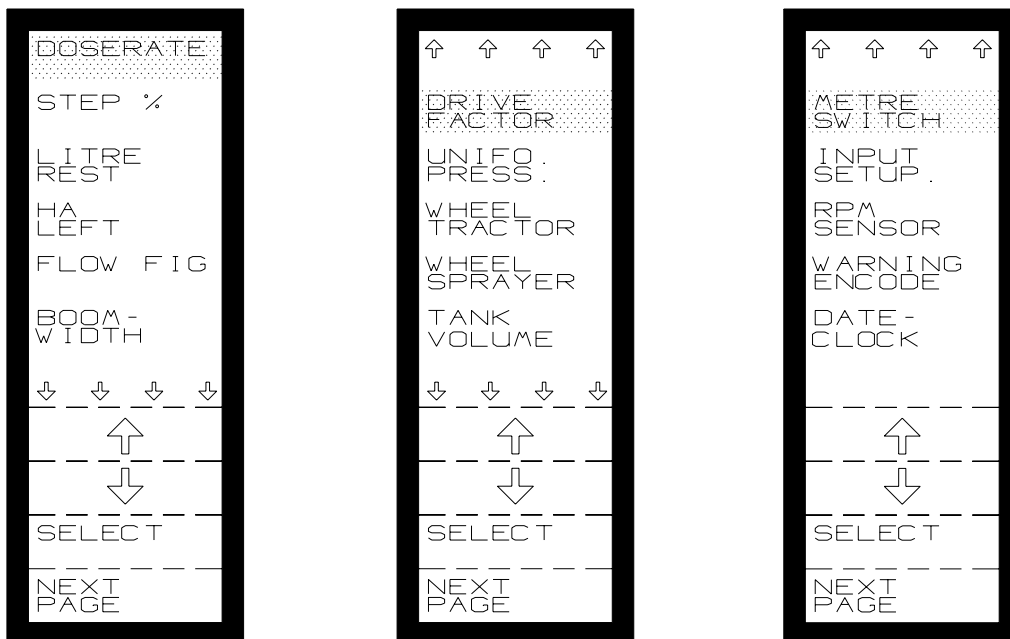
SPRAY ENCODEMENTS

In this menu you must enter the particulars for your Crop Sprayer.

The particulars you enter will be memorised automatically under "spray-encodements"

When you have entered a particular figure, press the "return" key to proceed to your next encodements.

NOTE! Check all your figures before you start work. (Simply: check your "Status" screen)



DOSERATE

Encode your desired application rate in **LITRES** per **HECTARE**. (max figure = 9999 L/Ha)

You can alternatively enter/alter your rate directly from the "operation" screen

The LH 20D flowmeter (most common size). Enter flow-figure 2000! (Guide only)!

Ask your dealer for recommended start figure when using a different size flowmeter.

DO'S AND DON'TS

DO: Check your flow-accuracy regularly! (check against a load)

DON'T: Do not calibrate your flow-figure against any worked area!

The computer offers an easy step-by-step calibration procedure, or you may chose to calibrate manually

STEP %

Enter your desired percentage figure. (one entry only for +/-%) (max figure = 99%).

LITRE LEFT

To see how much is left in the tank, you must encode the amount filled into the tank here.

If there is an amount remaining in the tank when filling, this amount must be added to the amount filled thus:

Amount remaining in tank + amount filled = Litre left.

NOTE! If the optional fill-flow equipment is fitted, **LITRE LEFT** is encoded automatically

HA LEFT

As above, you must enter the field size before commencing work. (End time & required fill amount are calculated from this parameter).

FLOW-FIGURE

This is the "calibration-figure" for your flowmeter.

In other words: The measuring accuracy of the liquid! You **MUST** calibrate your flowmeter. Recalibrate the flowmeter if the consistency of the liquid used changes.

FLOW CALIBRATION

Encode (LH20 D meter) a "start" figure of 2000.

Method 1. (The computer calibration-mode)

(Just follow this instruction and those on the screen)!

1. Fill the tank, or minimum 600 litres.
2. Encode the filled quantity in "**LITRE LEFT**", and return to "Flow figure".
3. Spray minimum 500 litres (All boom sections open, keep within normal pressure range (e.g.3 Bar). You may keep the machine stationary, using the simulated speed facility, (see "**SYSTEM**") or select "**MANUAL**" and set your pressure (see page 13).
4. Verify the remaining litres in tank on the tank scale! (Note: machine must be level).
5. Place the cursor on "**TANK LIT**" and encode the amount remaining in the tank.
6. Press the flashing "**CALC. FLOW**"- key!
7. The new flow-figure is now calculated and automatically encoded.

NOTE! If you should be uncertain regarding the accuracy of the tank-scale, it is recommended to take the machine to a weigh- bridge for verification.

Method 2: (Manual calibration method).

Your flow-calibration figure may be calculated as follows:

1. Fill tank with minimum 600 Litres.
2. Reset your "**LITRE**" counter (using the "**DATA DELETE**" menu).
3. Spray minimum 500 litres (All boom sections open, keep within normal pressure range (e.g.3 Bar). You may keep the machine stationary, using the simulated speed facility, (see "**SYSTEM**") or select "**MANUAL**" and set your pressure (see page 13).
4. Verify the remaining litres in tank on the tank scale (Note: machine must be level).
5. Verify your "**LITRE**" recorder reading in the "**DATA/DELETE**" menu.
6. Calculate your correct flow-figure, using this formula:

$$\text{NEW FLOW-FIGURE} = \frac{\text{Present flow-figure x sprayed amount}}{\text{Litre recorded on computer}}$$

$$\text{E.g.:} \quad \frac{2000 \times 500}{487} = 2053$$

The calculated new figure must be encoded in the computer.

BOOM WIDTH

The effective width of your sprayer (in cm.)

The **LH 4000** computer automatically compensates for open and closed boom sections.

Consequently each individual spray-sections must be encoded into the computer. Encode the widths one by one. Start with the left-hand side (section 1).

Proceed thus:

Move cursor to first section. Enter width (in Cm.) using the numeric keypad. Proceed to section 2 -3 etc!

DRIVE FACTOR

The "response-factor" for automatic application control mode. This parameter sets the "speed" of the reaction time of regulation. (e.g. Sprayer press regulation valve)

If the reaction is too slow = increase figure or vice-versa. Min fig. = 1. Max.= 500. "Normal" status, Start with 50.

REGULATION DELAY

Encode the number of seconds that regulation is delayed by after the main valve is opened. It is possible to encode from 0 to 9 seconds.

UNIFORM PRESSURE

Encode whether the controls of the sprayer are equipped with uniform-pressure valves (balance return-valves), or not.

ON = Yes **OFF** = No.

If "ON" remember to adjust your valves.

SPEED SENSOR (WHEEL TRACTOR, WHEEL SPRAYER)

You can chose between two different located speed sensors:

WHEEL TRACTOR

Sensor fitted to the tractor. Either externally, or an integrated (gearbox) sensor. (May apply e.g. if machine is self-propelled type).

WHEEL SPRAYER

Sensor located on the sprayer. (e.g. trailed sprayers).

Calibration of speed sensor. Sensors must be calibrated individually!

SPEED SENSOR CALIBRATION

Speed sensor calibration is extremely important! We recommend that you check the sensor calibration during the season. (This will ensure of compensation for tyre-wear.)

However, the design of the **LH 4000** makes calibration easy. You can calibrate using two methods; Automatic or Manual.

AUTOMATIC SPEED SENSOR CALIBRATION



1. Carefully, measure and mark a distance of 100 metres. (Not on tarmac, but field-condition soil surface)
2. Drive to "start" position of the 100-m distance, and press the "**CALIB.CALC**" key. The screen to the left will appear:
3. Drive the 100-metre distance. Stop exactly at the 100-m. mark.
4. A new function-key will appear; "**CALC. WHEEL**". Press this key, and the computer has automatically calculated and entered the calibration figure!
Should the flashing: "**CALC. WHEEL**" however not appear, the computer has received insufficient pulses from the sensor enabling it to "auto-calibrate". You must calibrate using one of the two "manual" alternatives:

"MANUAL" SPEED CALIBRATION.

E.g. when sensor is fitted to a wheel:

1. Mark the wheel (e.g. the valve), and mark the field.
2. Drive the machine exactly 10 revs, of the wheel.
3. Mark out on the Field.
4. Measure the driven distance carefully (to nearest cm). Calculate your calibration figure. Use the following formula:

Example:

The measured distance between marks = 52.80 metre (5280 centimetre)

The wheel turned 10 revs.

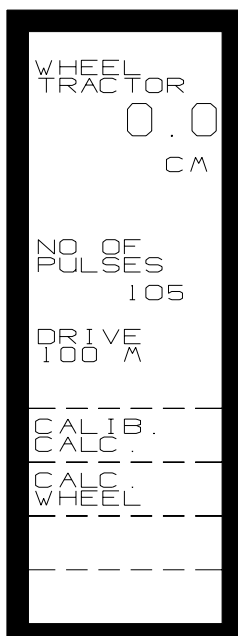
Four (4) magnets are fitted.

$$\frac{5280 \text{ (the distance driven in cm)}}{10 \text{ (the revs.)} \times 4 \text{ (the magnets)}} = 132.000 \text{ cm}$$

This figure: (132) is to be encoded. Press function-key **"WHEEL TRACTOR"**.

Encode 1 - 3 - 2 using the numerical keypad.

Incorrect encodements can be deleted using the **"C"**-key.

"Manual" speed calibration e.g. sensor fitted to a prop-shaft

1. Press the function-key : **"CALIB CALC"**. The screen to the left will appear:
2. Move (drive) slowly. Stop when **"NO OF PULSES"** changes from **"0"** (nil), to **"1"**.
3. Mark the field.
4. Drive slowly. Stop when **NO OF PULSES"** changes from **"50"**, to **"51"**.
5. Mark the field. Measure the distance between the two marks.
6. Divide the measured distance (cm), by 50.
7. Encode the result (in cm.) using the numerical keypad.

TANK VOLUME

The sprayer's tank size is encoded here. This is required if the automatic tank fill feature is to be used.

METRE SWITCH

Select whether distance-recording is started/stopped manually, "MANUAL", or by the selected override-service sensor (e.g. spray on/off switch).

INPUT SET-UP

The **LH 4000** software allows for a flexible set-up of electric connections to ANY TYPE of Crop-Sprayer controls. Select either: "**MAIN-VALVE**" or "**BOOM SECTION**".

The screen will read the current status. You may change setting by using the "Shut/Open OV." (volt)-key.

E.g.: Boom section "Shut" OV.

States that the wires connected to the boom section switches receive "**OV**" (ground), when the switch is in the "**OFF**" position.

This should be set by the engineer when the system is fitted.

RPM SENSOR

Select whether a **RPM** sensor is fitted and encode the number of pulses received per revolution.

NOTE! This function is not implemented in all sprayer fitting kits, ask your dealer.

WARNING ENCODE

KM/H: Warning **ON/OFF** and **MAX/MIN**. limits for speed warning.

NOTE! Activation of the speed warning provides and ensures minimum spray output when the speed-warning is given for the "low" limit setting. E.g. when the speed falls below that set in **KMH** warn the spray pressure will be maintained.

MIS-

DOSE RATE: Warning **ON/OFF** and Percent deviation of application rate.

LITRE LEFT: Warning **ON/OFF** for tank level

RPM: Warning **ON/OFF**, and max/min limits for **RPM**.

Only displayed if **RPM ON** is selected.

DATE-CLOCK

The following can be adjusted:

HOURS - MINUTES - YEAR - MONTH - DAY

SPRAYER - DATA DELETE

There are 3 main functions in this menu:

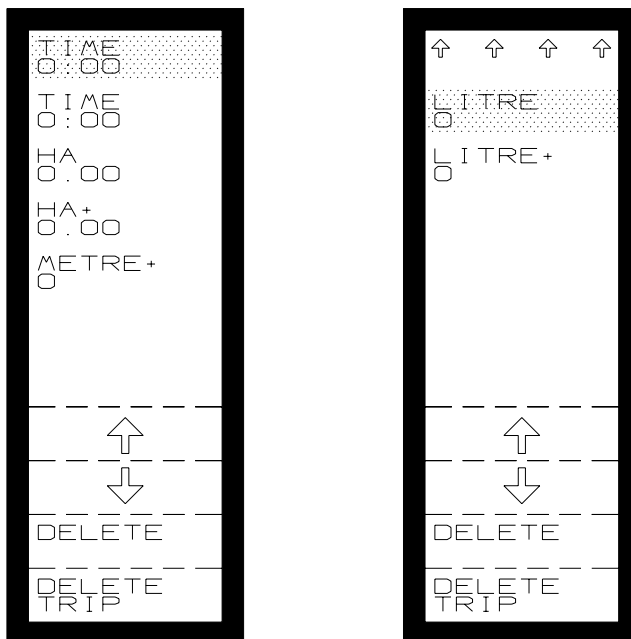
1. Reading of the total-counters (Accessible only here).
Reading the trip counters.
2. Deleting all counters by choice.
3. Deleting all trip counters simultaneously.

It is not possible to see/select the total-counters in the operation-menu.
Subsequently **"DATA"** / **"DELETE"** execution is available only in this menu.

Set the cursor (use the "arrow"-keys) to the counter to be deleted. Press the **"DELETE"** key to erase.

Should you like to reset **ALL TRIP COUNTERS**, press the **"DELETE TRIP"** key.

NOTE! Do not forget to take your notes before deleting!



The functions are:

- TIME:** Time counter for consumed time since reset.
TIME +: Total operation time since reset.
HA: Area counter. Worked area since reset.
HA+: Area counter. Total area worked since reset.
METRE+: Total distance travelled since reset.
LITRE: Litres consumed since reset.
LITRE+: Total litres consumed since reset.

NOTE! The "total" info is accessible only in the **"DATA/DELETE"** menu.

LOG BOOK

Your **LH 4000** holds a comprehensive "**LOG-BOOK**" facility. A total of 35 jobs (tasks) can be memorised individually. Should you like to use this, you must allocate a "job-No" in advance.

NOTE! The "trip"-counters: Time, Area, Litres are all automatically reset when you allocate a new "Task-no."

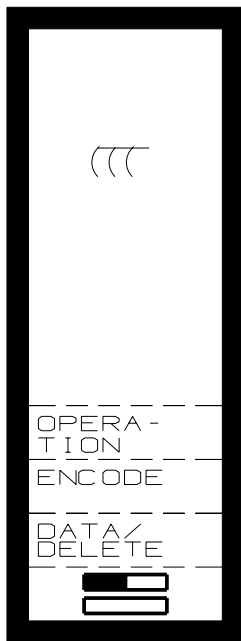
The functions to manipulate in the "Log-Book" mode are basically:

**START TASK,
END TASK,
SEE TASK,
DELETE TASK**

THE "LOG-BOOK", HOW TO USE THIS FEATURE

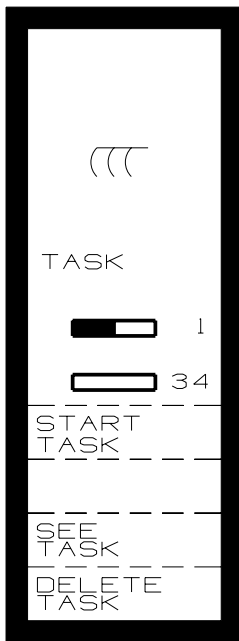


Pressing the lower function key displays the following:



Press the key indicated by the arrow

The screen shows the "**MODE**" you have selected. (In this case the sprayer-mode indicated by the symbol). The two oblong squares shows:



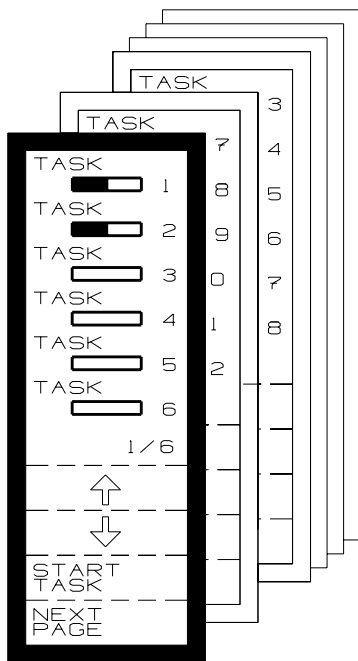
The upper: 1 (one) job no. is used. (oblong is "occupied")

The lower: 34 are "empty".

Press the **"START TASK"** -key.



START TASK

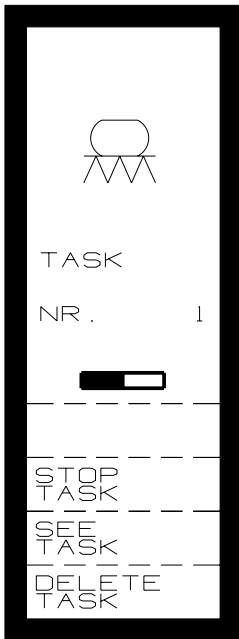


You may now use the "cursor" to select the individual "task" to "open"!

The "Task-number" you select, is your Log-Book reference no.!

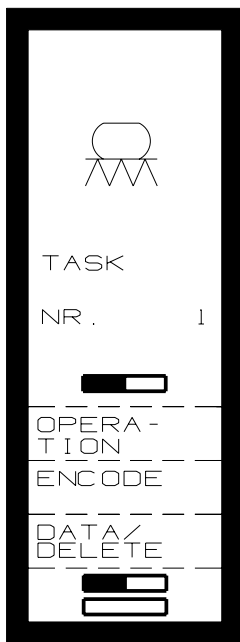
NOTE! Should you select an already "used" task
The "trip-counter" status will remain.
Consequently: Any "new" recordings are added on.
All trip counters are reset when any empty task is started.

Select a **"TASK"**. The following screen:



STOP TASK
SEE TASK
DELETE TASK

Press the **"RETURN"** key to proceed:



The "main operating" screen appears, indicating through the displayed text: **"TASK NO"**, and the oblong indicating you are in **"LOG-BOOK"**-mode.

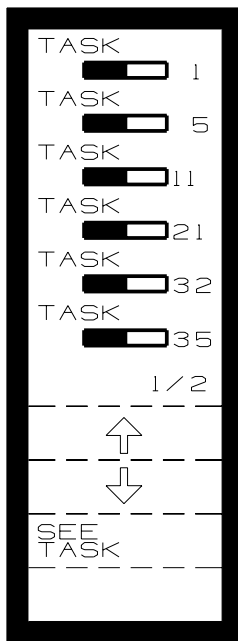


END TASK

You can at any time interrupt your present **"TASK"**. All recordings will be memorised (until you delete the task)

Please Note! You cannot escape your "operation" in the task-mode whilst any task is "open". Should you attempt, the screen will display a warning and indicate which task is to be "closed"

SEE TASK



Should you like to verify any task.

Press **"SEE TASK"**. Move cursor to desired task.

Press the **"SEE"**-key. Screen will display the recorded data for that task.

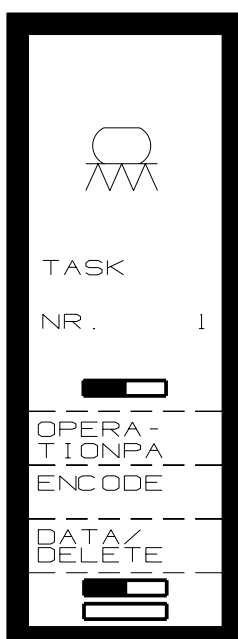
DELETE TASK

Please note that deleted data is irrevocable!

Move the cursor to the desired task. Press the **"DELETE"** key.

NOTE! Do not delete before you take your notes!

EXITING "TASK-MODE"



Press **"RETURN"** until this screen is displayed:

Press the **"TASK-MODE"** (lower function key) symbol.

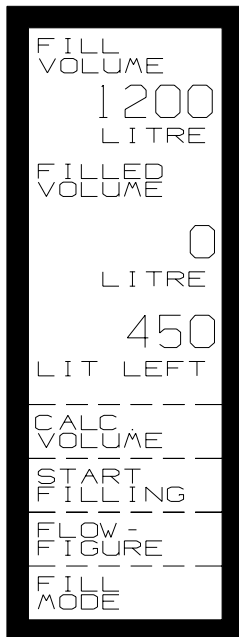
Press the **"END TASK"**-key.

TANK FILL FEATURE



The "**HOLD**" key gives instant access to the Tank Fill features:

NOTE! This is an optional feature that requires specific parts to be fitted to your sprayer. Ask your dealer for details.



FILL

VOLUME: The amount required to be filled. This is calculated through the "litre rest - Ha rest, the tank-size, and the present application rate"

FILLED

VOLUME: The amount measured (by the fill-flowmeter).

LITRE LEFT: Calculated amount remaining in the tank

NOTE! If the actual (tank) amount does not correspond with this reading, the spray-flowmeter may need re-calibrating.

CALC.

VOLUME: The required amount is automatically calculated when you press this key.

START

FILL: Pressing this key starts recording amount filled, and opens the optional fill-valve

FLOW

FIGURE: The calibration figure for your Fill-flowmeter.

FILL MODE: Select whether a valve is used to stop the flow (**VALVE**) or whether a warning is given (**WARNING**).
Selecting **WARNING** gives a visible (on screen) and audible warning.
Selecting **VALVE** allows for an electric valve to open/shut.

FILL-FLOWMETER CALIBRATION

NOTE! The Fill-flowmeter is an independent unit. Subsequently it **MUST** be calibrated individually!

However, as automatic calibration-mode is provided by your **LH 4000** for the spray-flowmeter, so it is for your **FILL**-meter!

The accuracy of the calibration procedure depends on the amount used for calibration. The following example uses 1000 litres.

Please double-check the calibration of the fill-flowmeter.

Proceed thus:

1. Select "**FLOW-FIGURE**" through the sub-menu.
2. Check that a figure is encoded. If not, enter e.g. 4000.
3. Press the "return"-key to return to the previous screen.
4. Enter a "**FILL VOLUME**" Enter approx. twice the amount you may require.
5. Press the "**START FILL**" key in the sub-menu.
6. Fill the tank with an exact "known" amount (through the fill flowmeter). (You may use a weigh-bridge for optimal accuracy).
7. Select "**FLOW-FIGURE**" in the sub-menu. Move cursor to "**TANK LITRE**". Encode the amount here.
8. Press the flashing "**CALC. FLOW**" key. The flow-figure will be calculated (and entered) automatically.

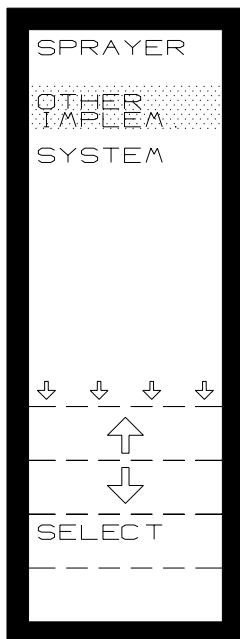
OTHER IMPLEMENT

Your **LH 4000** may be used in conjunction with any type of machine or implement where various monitoring or recording services are required.

The "Other Implement" operation of the computer is designed to be similar to the sprayer-menus. Consequently, the major part of this section should already be familiar to you.

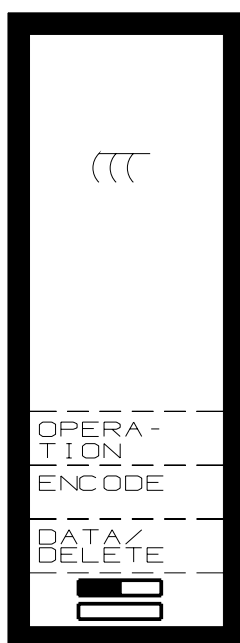
Should you have specific requirements for services not available in the computer, please inquire for the "upgrade" versions available of the LH 5000 computer-range.

Press the **"RETURN"**-key to return to the **"MAIN MENU"**.



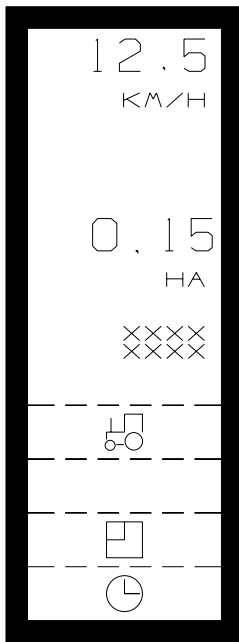
Select **"OTHER IMPLEMENT"**.

Move the Cursor and press **"SELECT"**.



You can now select between the displayed functions. The following chapter details the individual functions.

OTHER IMPLEMENT, OPERATION



SPEED:

The Top information is Speed. The speed is read as Km/h to one tenth.

Speed is calculated with the selected sensor (Wheel tractor-Wheel-implement).

AREA:

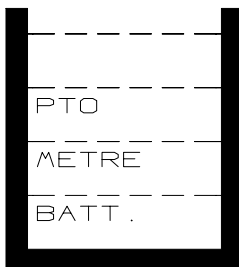
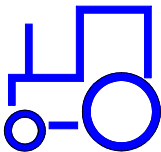
Area is recorded in Hectares. The readings up to 99.99 Ha are provided to one hundredth. Above this to one tenth.

NOTE! The **DATA/DELETE** menu provides the Total Area-counter.

NOTE! Do not forget to reset your counters using **DATA/DELETE** before you commencing work!

SELECTABLE FUNCTIONS

TRACTOR FUNCTIONS



PTO: PTO revs. (requires sensor on the shaft)

METRE: Driven distance in metres.

**METRE START/
METRE STOP:** Manual start/stop of distance recorder

BATT: System voltage.

PTO: The revs. of the shaft.(may be other than PTO)!

METRE: Driven distance in Metres. Is recorded through the speed sensor. Can be activated manually, or in conjunction with the "override" sensor. (Implement -Sensor). Select the mode in the **ENCODE** menu.

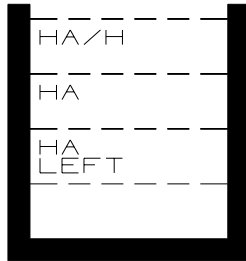
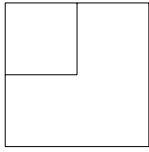
or

**METRE START/
METRE STOP:**

Manual Start/stop of the metre counter. These soft keys will only appear if you have selected the manual mode-switch.

BATT.: The present voltage of your battery.

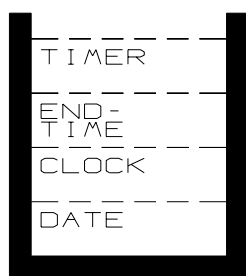
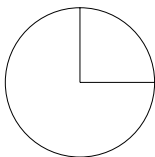
AREA FUNCTIONS



- HA/H:** Work efficiency.
- HA:** Area worked.
- HA LEFT:** Remaining area to work.

- HA/H:** Work Efficiency. The area cover per hour calculated with the present speed and working width.
- HA:** Area Counter. The worked area since last reset. May be reset through the **"DATA/DELETE"** menu where the "Area Total" counter is also to be found.
- HA LEFT:** The remaining area to be worked. Presupposes encodement of the field size before work commences.

TIME FUNCTIONS



- TIMER:** Work time in Hours & minutes.
- END TIME:** Expected finishing time for the current work.
- CLOCK:** Actual time.
- DATE:** Actual Date.

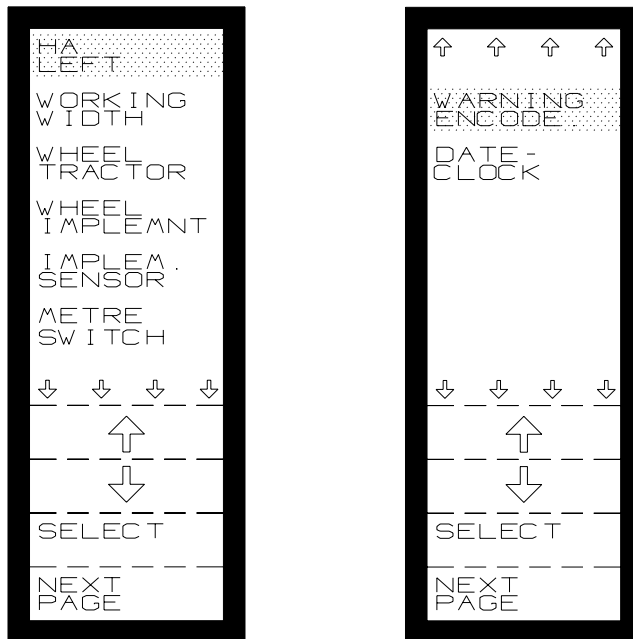
- TIMER:** May be used to record the time used for a particular job. Is started/stopped manually and can be reset in the **"DATA/DELETE"** menu. Here you also find the "Total time" counter.
- END TIME:** Expected time of day at which the job will be complete. Requires encodement of field size (HA LEFT).
- CLOCK:** The actual time. Can be altered in **ENCODE**.
- DATE:** The actual Date. Can be altered in **ENCODE**.

OTHER IMPLEMENT, ENCODE

This menu allows for encodements of your **LH 4000** in conjunction with jobs other than Spray-work.

NOTE! Encodements in this menu do not interfere with the encodements you may have done in the Sprayer-Menu!

NOTE! You must check your encodements through the "status" screen, which will always be shown before you are allowed to enter the operation screen.



HA LEFT

Before commencing your work, you may encode the size of the field. From this parameter "End Time" is calculated.

WORKING WIDTH

The effective working width of your implement, (in cm.) Do not forget the "overlap", which may cause incorrect measurements.

SPEED SENSOR (WHEEL TRACTOR, WHEEL IMPLEMENT)

Your **LH 4000** provides for two differently located speed sensors.

WHEEL-TRACTOR

A sensor fitted on the tractor.

NOTE! Possible wheel-slippage will interfere with accuracy unless you compensate through with wheel calibration

WHEEL IMPLEMENT

You may desire to have a permanent sensor fitted on a trailed machine for improved accuracy. Whenever applicable, speed sensors located on large-driven wheels enhances accuracy.

SPEED SENSOR CALIBRATION

The **LH 4000** provides an automatic-calibration-feature for the speed-sensor. However, you may need or desire to calibrate using a "manual" procedure.

Both procedures are detailed in the "**SPRAYER**" section pages 18 & 19.

Calibrate your sensor as described.

IMPLEMENT SENSOR

The implement sensor is the sensor that starts and stops the area meters.

In **OTHER IMPLEMENT** you can choose between the following:

1. Lift (sensor connected via rear of 7 pin socket).
2. PTO (if a PTO sensor has been mounted).
3. Implement (sprayer main on/off switch starts/stops area recordings).

METRE-SWITCH

The menu where you decide whether distance recording is controlled "manually", or in conjunction with the "override" sensor.

WARNING ENCODE

PTO: Warning **ON/OFF** and rev. **MIN/MAX** limits.

KM/H: Warning **ON/OFF** and **MIN/MAX** speed limits.

DATE/CLOCK

Adjustment of:

TIME - YEAR - MONTH - DAY

OTHER IMPLEMENT-DATA/DELETE

There are 3 main options in this menu.

1. Reading of "total-counters" (only accessible here)
Reading of "trip-counters"
2. Delete individual counter.
3. Delete all "trip-counters"

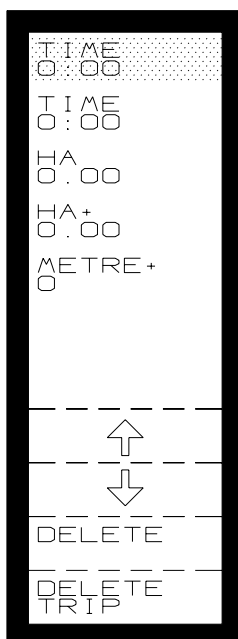
NOTE! The **"DATA/DELETE"** menu is the only menu available to read and delete the "total-counters".

To delete the counters move the cursor to the desired position. Press **"DELETE"**.

To delete all "Trip-counters" simultaneously: Press. **"DELETE TRIP"**.

NOTE! Before deleting any records, take your notes. Deleted recordings are irrevocable!

Records are:



- TIME:** Work time since last reset.
- TIME+:** Total work time since last reset.
- HA:** Worked area since last reset.
- HA+:** Total worked area since last reset.
- METRE+:** Total driven distance since last reset.

"+" -counters accessible only through the **DATA/DELETE** menu.

LOG-BOOK

Your **LH 4000** provides a "Log-Book" feature. Up to 35 individual jobs can be memorised in the computer. This feature and how to work it is detailed on page 22 to 25 in the "**SPRAYER**" section.

NOTE! Any "job-number" which you may issue in the "Other-Implement"-mode will be transferred whilst you select the "Sprayer-Mode".

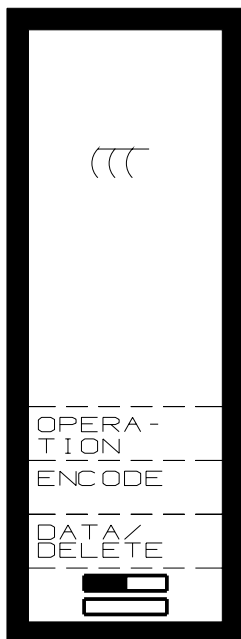
Please Note: You cannot escape your "operation" whilst in task-mode if any tasks are "open"!

Should you attempt, the screen will display a warning and indicate which task to "close"!

The functions to manipulate in the " Log-Book" mode are basically:

- START TASK**
- END TASK**
- SEE TASK**
- DELETE TASK**

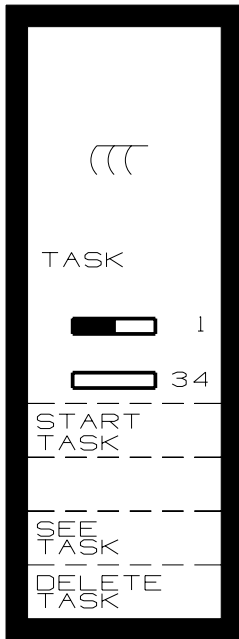
THE "LOG-BOOK", HOW TO USE THIS FACILITY



Press the key indicated by the arrow

The screen shows the "mode" you have selected. (In this case the other implement-mode, indicated by the symbol).

The two oblong squares shows:

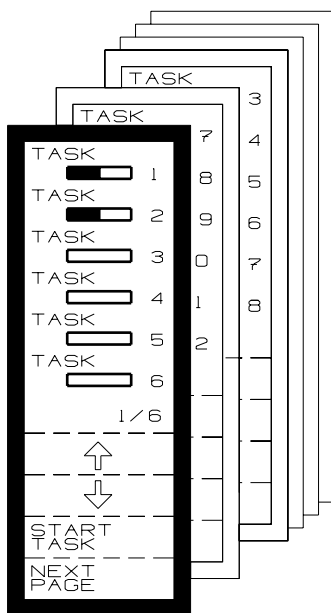


The upper: 1 (one) job no. is issued. (oblong is "occupied")

The lower: 34 are "EMPTY".

Press "START TASK" -key.

START TASK



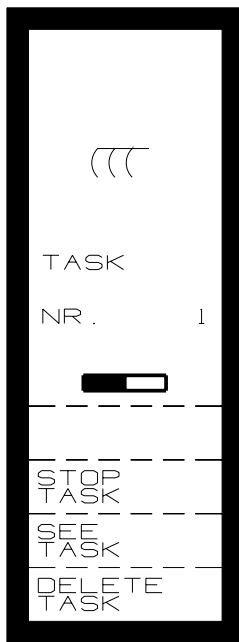
You may now use the "cursor" to select the individual "TASK" to "OPEN"!

The "TASK-NUMBER" you select, is your Log-Book reference no.!

NOTE! Should you select an already "open", task
The "trip-counter" status will remain.
Consequently: Any "new" recordings will be added on.

Should you "START" any "EMPTY" task. The Trip-counters are all reset.

Select a **"TASK"**. The following screen appears:



STOP TASK

SEE TASK

DELETE TASK

Press the **"RETURN"** key to proceed:



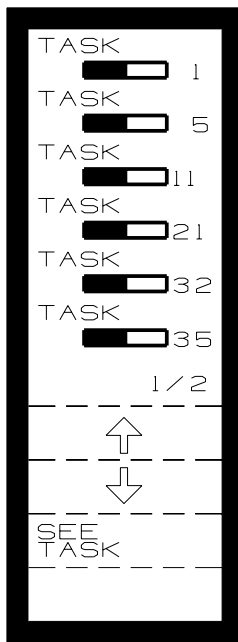
Your "select" screen appears, now indicating through the shown text: **"TASK NO"**, and the oblong indicating you are in **"LOG-BOOK"**-mode.



END TASK

You can at any time interrupt your present **"TASK"**. All recordings will be memorised (until you delete task)

Please Note! You cannot escape your "operation" in the task-mode whilst any task is "open". Should you attempt, the screen will read a warning and indicate which task is to be "closed".

SEE TASK

Should you like to verify any task No.

Press **"SEE TASK"**.

Move cursor to desired task.

Press the **"SEE"**-key.

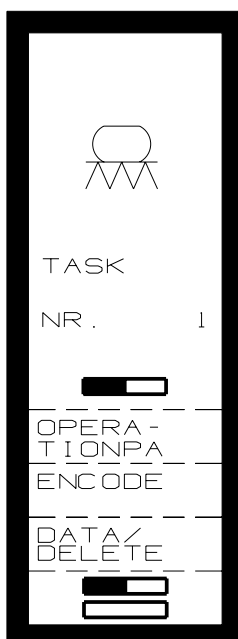
Screen will read the recorded data on that task.

DELETE TASK

NOTE! Deleted data is irrevocable!

Do not delete before you take your notes!

Move cursor to desired task. Press the **"DELETE"** key.

LEAVING "TASK-MODE"

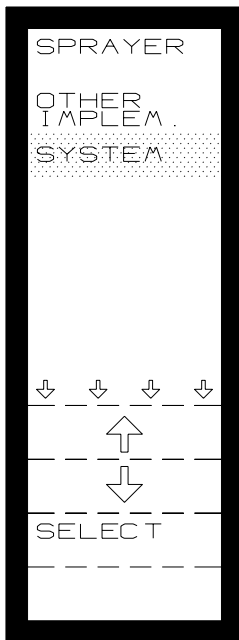
Press **"RETURN"** to display this screen:

Press the **"TASK-MODE"** (lower) symbol,

At this screen, press the **"END TASK"**-key.

SYSTEM MENU

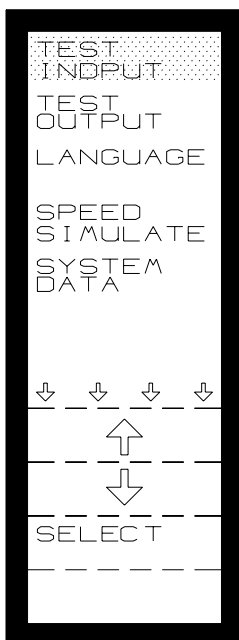
The **"SYSTEM"**-menu is basically a service feature.



In the unlikely event of malfunctions, this menu provides a comprehensive set of individual **"TEST"** facilities.

However, the menu also provides a very useful feature, which allows you to **"SIMULATE"** forward speed! (detailed below)

You may use the **"SIMULATE SPEED"** e.g. whilst you set up your sprayer.



TEST INPUT: Test input of all sensors etc.

TEST OUTPUT: Test of all outputs, e.g. power to valve.

LANGUAGE: Select operating language.

SPEED SIMULATE: Speed simulation.

SYSTEM DATA: Non customer accessible info.

TEST INPUT

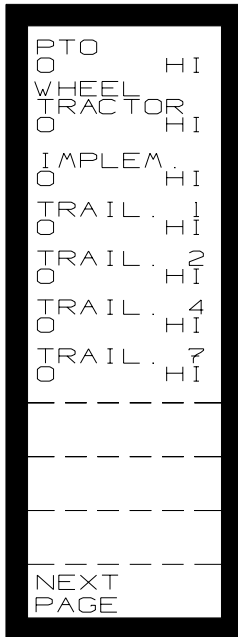
Should you observe any malfunction, conduct a test of all circuits and sensors with the test-program.

The Screen:

Each text string has a "counter" shown at the L/H side. The figure must change each time a "pulse" (signal) is received.

The R/H side shows the actual status: "**HI**" or "**LO**".

The individual input "ports":



PTO: Signal from the PTO-sensor.

WHEEL TRACTOR: Signal from the wheel sensor.

IMPLEMENT: Area override signal. (Tractor)

TRAIL 1: Signal from pressure sensor. (if applicable)

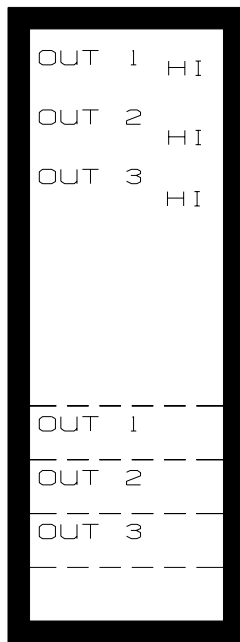
TRAIL 2: Signal from the spray-flowmeter.

TRAIL 4: Signal from wheel-sensor on implement (if applicable)

TRAIL 7: "Override" signal. (e.g. pray-valve)

BOOM 1 TO 9: Status of boom-sections.

TEST OUTPUT



- OUT1:** The power "increase" output to regulator valve.
- OUT2:** The power "decrease" output to regulator valve.
- OUT3:** Output to "fill" valve(if applicable)
- OUT 4:** Not used.

NOTE! The **"SYSTEM"** test feature comprises of three screens. Move to next screen using the **"NEXT PAGE"**-key.

NOTE! Activation of any in- or outputs in the test **"SYSTEM"**- mode disregards any possible malfunctions you may have provoked through a wrong/mistaken encodement. Any possible failure caused by defects in the computer software is therefore disregarded!

SPEED SIMULATION

E.g. whilst testing or calibrating machines it may be desirable to conduct a performance test at a stand-still.

To simulate speed, do as follows:

Put **SPEED-SIMULATE "ON"** in the menu. Return to your **"OPERATION"**-menu. Enter the desired speed through the numeric-keys!

How to disable the **"SIMULATED SPEED"**.

Either:

1. Move vehicle forward, the **"SIMULATE"** speed will be cancelled automatically.

or

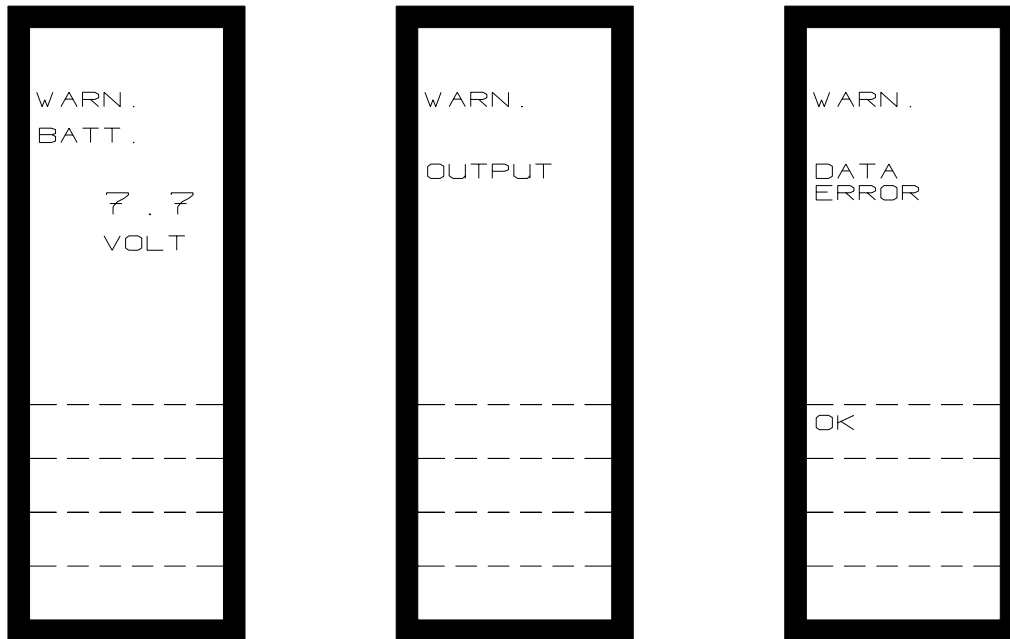
2. Encode a simulated speed of **"0"** (nil). After 8 sec., you can return to **"SYSTEM"** for setting **"SIML. SPEED"** to **"OFF"**.

SYSTEM DATA

Information not accessible by the operator.

ERROR-MESSAGES

Your **LH 4000** will display various "error" messages should abnormalities occur:



VOLTAGE WARNING

Should the power supply drop below 10 V. This warning may appear during start or if battery is weak.

WARNING OUTPUT

Warning of short-circuits in the power supply to the regulator valve.

MEMORY-FAILURE

Should the computer fail to memorise data. You may overrule this warning by pressing the **"OK"** -key. However, check your encodements should this warning appear.

Should your **LH 4000** display errors frequently, consult your dealer.

MACHINE SETTING CHART

Flow figure:	Sprayer		Fill flow	
---------------------	----------------	--	------------------	--

Boom Width:	Boom sections (cm):	
	1:	
	2:	
	3:	
	4:	
	5:	
	6:	
	7:	
	8:	
	9:	
Total Boom Width:		

Drive factor:	
----------------------	--

Uniform pressure:	ON		OFF	
--------------------------	-----------	--	------------	--

Wheel circumference:	Wheel tractor		Wheel sprayer	
-----------------------------	----------------------	--	----------------------	--

Metre switch:	Main valve		Manuel	
----------------------	-------------------	--	---------------	--

Input setup:	Boom Section		Main valve	
---------------------	---------------------	--	-------------------	--

NOTES
