LH 5000

Screen

♥ =HOLD

OPERA-
TION
ENCODE
DATA/
DELETE

Function keys

Returnkey

7 8 9 Tractor infokey

4 5 6 Contrast key

1 2 3 Remember key

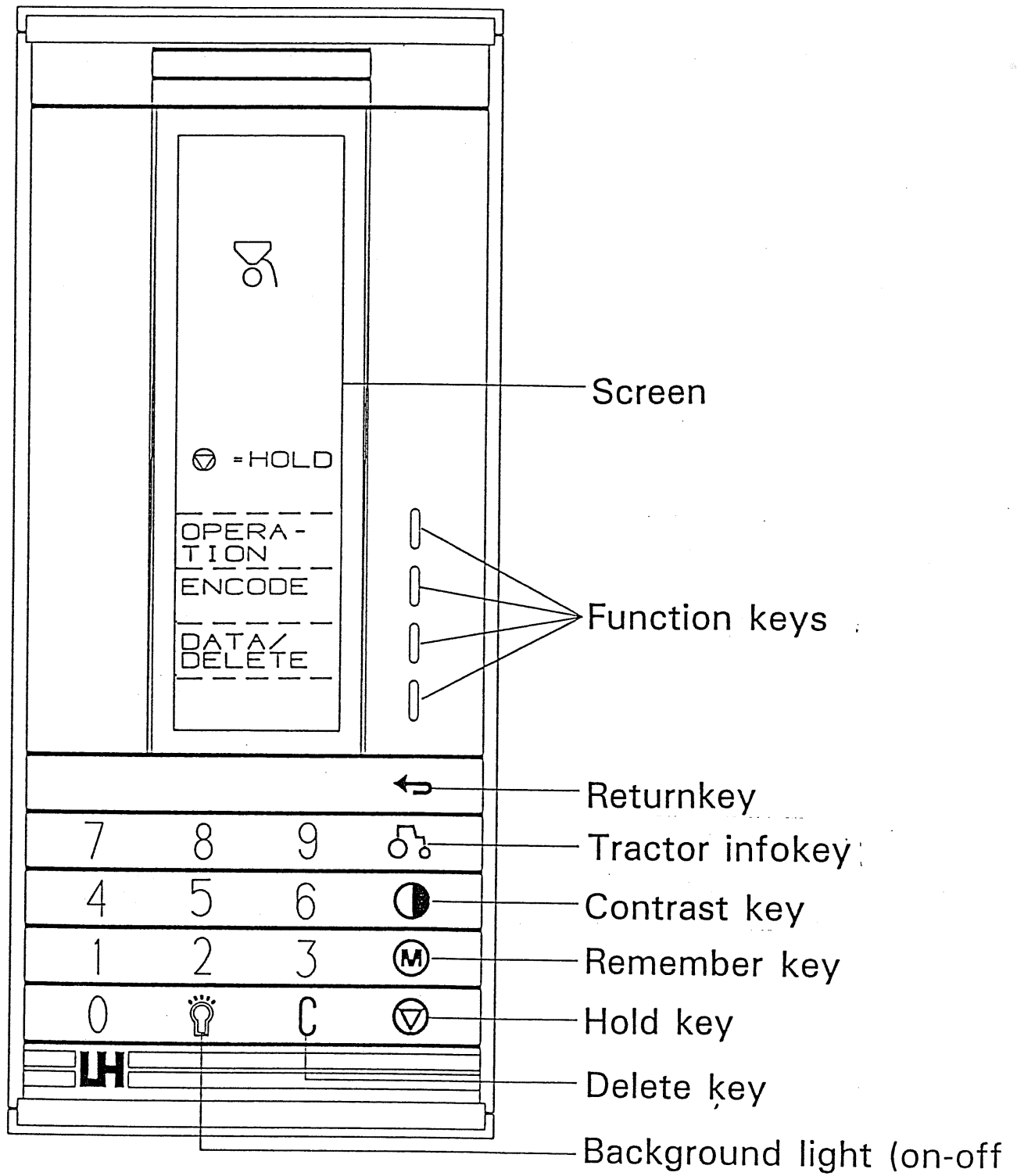0 C Hold key

LH Delete key

Background light (on-off

9423-0758

FOREWORD

May we congratulate you on your new **LH 5000 Seed Drill computer.**
At the development of this device we have made a point of producing an advanced, userfriendly, and hard-wearing product, which will - if used according to this instruction - serve you well for many years.

Together with "the screen", on which text, numbers, and pictures are shown, the structure of the programme almost make the operation of the computer independent of the instruction. This has therefore been made more as a reference book than an ordinary instruction.

In front of the book you will find an index showing the main sections and subsections.

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1. Introduction

2. General functions

- Firm keys
- Function keys

3. Seed drill

- Operation
- Encoding
- Data delete

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- Operation
- Encoding
- Data delete

5. System

- Test input
- Test output
- Choice of language

6. Monting instruction

INTRODUCTION

The **LH 5000** computer with the Nordsten seed drill programme is especially developed for control of Nordsten seed drills with "Electronic gearbox".

The menu system is in principle built as a book, where you can turn forwards or backwards. The programme of the computer is divided into 3 main sections:

· **Seed drill**
· **Other implements**
· **System**

This instruction deals with all the functions of LH 5000, also those demanding optional equipment. In the section "Mounting instruction" it is shown on the system drawing, which parts are standard and which parts are optional equipment.

Unfold the page at the back of this instruction manual before you read the following.

General functions

GENERAL FUNCTIONS

In this section the keys and general functions which are in common use for the three main sections are described.

The coding values (e.g. wheel circumference), which is a condition for several of the functions, will be mentioned under the respective implements, as each implement has separate coding values.
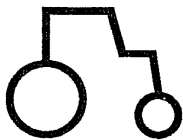
FIRM KEYS:

RETURN KEY

The return key is used to look back, one page at a time each time the key is activated. The return key is also used to confirm the status pictures.
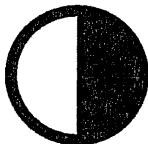
TRACTOR INFO KEY

When pressing this key a number of important tractor functions are displayed, no matter what function you are already in.

The tractor info functions are:

- **Speed**
- **Wheel slip**
- **Consumption of diesel per hour**
- **Running efficiency per hour**
- **Area**
- **Remaining area**

The tractor info picture is cancelled by pressing the return key.

CONTRAST

Having activated this key the contrast (light/dark) of the screen can be adjusted. This ensures readability can be adjusted under all circumstances.

By extreme coldness or heat totally bright or black screen might occur. The contrast key might compensate, but the screen will return to normal when the computer achieves normal working temperature.

At the top of the picture a counter is shown. The normal number is 45-50.

- **Contrast + = darker screen**
- **Contrast - = brighter screen**

When activating the "Delete key" contrast is adjusted to normal value.

REMEMBER KEY

The remember key functions as a book marker, which by a pressure on the key is put in on the page of the menu system chosen for the time being, before more pages are turned. You can return to the page again only by activating the key again.

NB!   **"The remeber key"** does only function within one implement at a time and only in **"Operation"**.

KEEP KEY
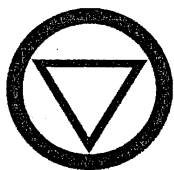
Is used for cancelling of implement lift in the seed drill programme.

DELETE KEY

The delete key is used together with the number keys when coding. Deletes the number-size chosen. Is also used to reset the impulse counter in the "Test function".

BACKGROUND LIGHT

Is used to turn the background light of the screen on and off.

FIGURE KEYBOARDS

0
i
9

Is only used when coding.

FUNCTION KEYS:

By means of the 4 function keys and the return key it is possible to turn through all the functions of the computer.

The function of each of the 4 function keys is shown on the screen just to the left of the key.
The function of the individual keys will change all the time, depending of where in the programme you are (see the examples).
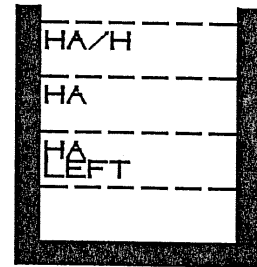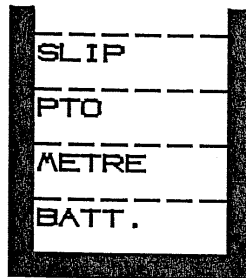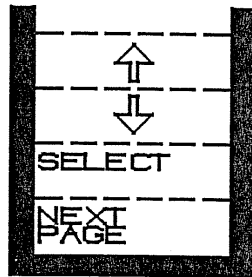
BASIC MENU:
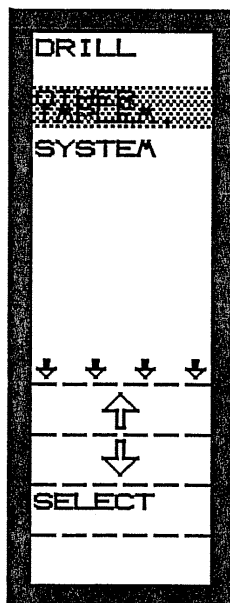
The screen shown is the first in the menu system. From this picture the superior choice of implement is made.

1. Move the cursor (the dark field) to the implement wanted by means of the arrow keys.
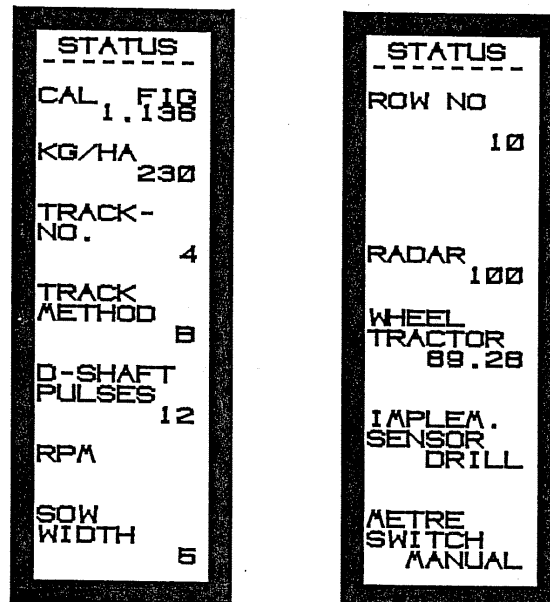2. Press the function key "Select"

IMPORTANT!

When working in Operation (working in the field), where implement and thus sensors are chosen, you must not turn between the individual main menus (seed drills, other implement, and system).
If a shift is tried during operation the following message is shown on the screen: **"MENU SHIFT NOT ALLOWED"**

STATUS PICTURE

Each time the "Running menu" of a new implement is chosen or a coding menu is left, a set of status pictures is shown.
Here all the coding values chosen for the implement in question are shown.

```
 _STATUS_            _STATUS_
 --------            --------
CAL   FIG          ROW NO
   1.138
                          10
KG/HA
      230
TRACK-
NO.                RADAR
      4                 100
TRACK
METHOD             WHEEL
      8            TRACTOR
                      89.28
D-SHAFT
PULSES             IMPLEM.
      12           SENSOR
                      DRILL
RPM
                   METRE
SOW                SWITCH
WIDTH                 MANUAL
      5
```

The status pictures are approved by pressing the return key.

Seed Drill

SEED DRILL

```
┌─────────────┐
│ ▓▓DRILL▓▓▓▓ │
│ ▓▓▓▓▓▓▓▓▓▓▓ │
│ OTHER       │
│ IMPLEM.     │
│ SYSTEM      │
│             │
│             │
│             │
│ ↓  ↓  ↓  ↓  │
│     ⇧       │
│─ ─ ─ ─ ─ ─  │
│     ⇩       │
│─ ─ ─ ─ ─ ─  │
│ SELECT      │
│─ ─ ─ ─ ─ ─  │
│             │
└─────────────┘
```

From the basic menu seed drill is chosen as follows:

1.   Move the cursor (the black field) to **"DRILL"** by means of the arrow keys.

2.   Press the function key **"SELECT"**.

Then the following picture is shown.

```
┌─────────────┐
│             │
│             │
│      ♉      │
│             │
│             │
│             │
│   ⊘ -HOLD   │
│─ ─ ─ ─ ─ ─  │
│ OPERA-      │
│ TION        │
│─ ─ ─ ─ ─ ─  │
│ ENCODE      │
│─ ─ ─ ─ ─ ─  │
│ DATA/       │
│ DELETE      │
│             │
└─────────────┘
```
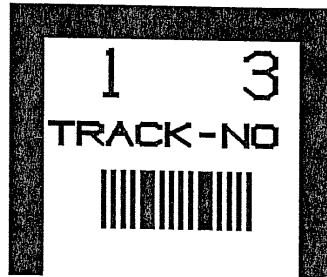
Press the function key **"OPERATION"**.

It is now possible to choose between the shown functions. They will on the following pages be gone through one by one.

FIRM FUNCTIONS:

CONTROL OF TRAMLINING:

The first display numbers are for control of tramlining. In the display the following picture is shown:


running track   track number

Running track is the track in the field where you drive at the moment (is counted 1 up each time the drill is lifted). The track number corresponds to the preset number (see "ENCODING").

A short alarm sound is given each time the drill is lifted.

Indication of tramlines:
The second display indicates graphically on the screen whether tramlines are made.
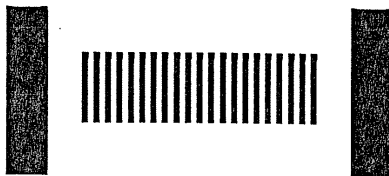
Tramlines are not made.   Tramlines are made.
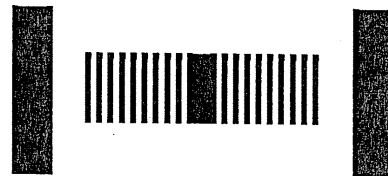
KG/HA:
The third function is showing dosing. The dosing is shown in kilos per hectare, only when the drill is moving.

Dosing status:
2 arrows are shown to the left in the display indicating whether the computer is adjusting the dosing up or down at the moment.

The conditions for correct display is:

1.   That a correct calibration is made.
2.   That a correct wheel circumference and working width are encoded.

Hold key:

 Is used if you do not want tramlining to be counted. The function "locks" the actual status, irrespective of lift of the machine. When this function is active "HOLD" is flashing on the screen.

OPTIONAL FUNCTIONS:

At bottom of the screen a symbol is shown opposite each of the four function keys showing which functions are available when pressing the key.

TRACTOR FUNCTION:

SLIP	=	Wheel slip
PTO	=	Revolutions on PTO shaft
DIST	=	Distance driven
BATT	=	Battery voltage

Slip:
Wheel slip in per centage. Shows the relation between speed measured on wheel or cardan and speed measured with radar. This function is only active if radar is mounted and switched on ("ON") in encoding.

PTO:
Shows revolutions per minute on the power take off. This function is only active with revolution sensor mounted.

DIST:
Shows driven distance measured in meters. Is measured from the speed sensor chosen. Is started and stopped by the implement sensor or by manual pressure on "DIST" (Chosen under encoding).
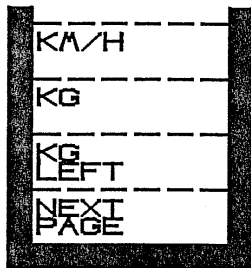
BATT:
Shows the supply voltage to the computer.

By pressing the **"RETURN KEY"** you will return to the menu for the functions that can be elected.

SEED DRILL FUNCTION:
(4 displays)

```
┌─────────────┐
│ KM/H        │
│ KG          │
│ KG          │
│ LEFT        │
│ NEXT        │
│ PAGE        │
└─────────────┘
```

Display 1

KM/H	=	Speed
KG	=	Sown quantity
KG REST	=	Number of kilos left in the hopper

KM/H:
Speed in kilometers per hour shown to 1 decimal place. The speed is measured from the sensor chosen in encoding.
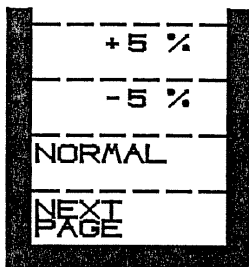
KG:
Total sown quantity of seed in kilos. Calibration of the drill is necessary for accurate display.

KG LEFT:
Number of kilos left in the hopper, filled quantity is entered before starting, see "ENCODING".

By pressing "NEXT PAGE" you will see:

```
┌─────────────┐
│    +5 %      │
│    -5 %      │
│ NORMAL       │
│ NEXT         │
│ PAGE         │
└─────────────┘
```

Display 2

+5%	=	Step dosing, increase.
-5%	=	Step dosing, reduction.
NORMAL	=	Return to normal dosing.

+5%:
Step dosing, increases the seed rate in steps. The size of the steps is entered in "ENCODING".
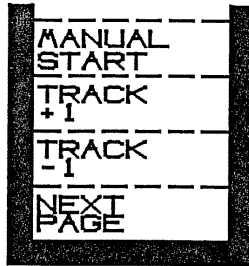
-5%:
Step dosing, reduces the seed rate in steps. The size of the steps is the same as for above.

NORMAL:
Normal dosing. Irrespective of how many times (steps) you have pressed either + or -, pressure on this key will get you back to normal dosing. (The one entered in "ENCODING").

By pressing **"NEXT PAGE"** you will see:

```
┌─────────────┐
│ MANUAL      │
│ START       │
│ ─────────── │
│ TRACK       │
│ +1          │
│ ─────────── │
│ TRACK       │
│ -1          │
│ ─────────── │
│ NEXT        │
│ PAGE        │
└─────────────┘
```

Display 3

MANUAL

START/STOP = Manual start or stop of the sowing shaft electric motor

TRACK + 1 = Actual running track + 1

TRACK-1 = Actual running track -1

MANUAL START/STOP:

This function is used when you want to start or stop the sowing shaft electric motor manually.

"**MANUAL START**" can only be used when drill sensing wheel is stopped, that means that the function key shifts to "**MANUAL STOP**" at first wheel impulse.
Manual start can be used in difficult accessible corners etc. and ensures complete sowing of the field. By pressing this key the sowing shaft electric motor revolves for 3 seconds (for each press of the function key 3 seconds are driven).

By pressing "**MANUAL STOP**", the sowing is stopped immediately. This function can be used on pneumatic machines with grain transport routes so long that they cannot be quite emptied before the coulters are lifted from the ground.

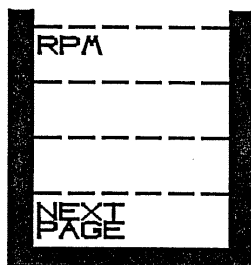After having activated "**MANUAL STOP**" the implement has to be lifted.

TRACK + 1:

Advances 1 bout of the actual running track, when making tramlines.

TRACK-1:

Counts 1 back for the actual running track, when making tramlines.

By pressing "**NEXT PAGE**" you will see:

NB!   RPM is only shown if this is chosen under encoding
          (i.e. pneumatic drills).

```
┌─────────────┐
│ RPM         │
│ ─────────── │
│             │
│ ─────────── │
│             │
│ ─────────── │
│ NEXT        │
│ PAGE        │
└─────────────┘
```

Display 4

RPM = Revolutions for blower

RPM:

Shows revolutions per minute for blower on pneumatic seed drills (if sensor is mounted).

By pressing the "**RETURN KEY**" you will return to the menu for the functions that can be selected.

AREA FUNCTION:

HA/H	
HA	
HA LEFT	

HA/T	=	Driving efficiency
HA	=	Area
HA LEFT	=	Remaining area

HA/T:
Driving efficiency. Shows how large an area worked per hour at the actual speed for the implement used.
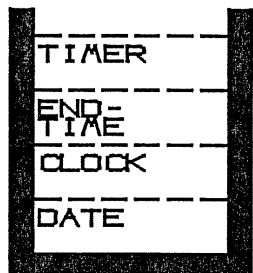
HA:
Area counter. Shows worked area in hectare since reset.

HA REST:
Shows remaining area, it is a condition that the size of the field is encoded before start.

By pressing the **"RETURN KEY"** you will return to the menu for the functions that can be selected.

TIME FUNCTION:

TIMER
END-TIME
CLOCK
DATE

TIMER	=	Working time in hours and minutes.
END TIME	=	The final time of the work.
CLOCK	=	The time in hours:minutes:seconds.
DATE	=	Day:month:year.

TIMER:
Is used for measuring the time walked for a certain job. The stop watch is stopped and started manually.

END TIME:
Shows when the actual job can be expected to be finished, calculated from the actual driving efficiency and the remaining area encoded.

CLOCK:
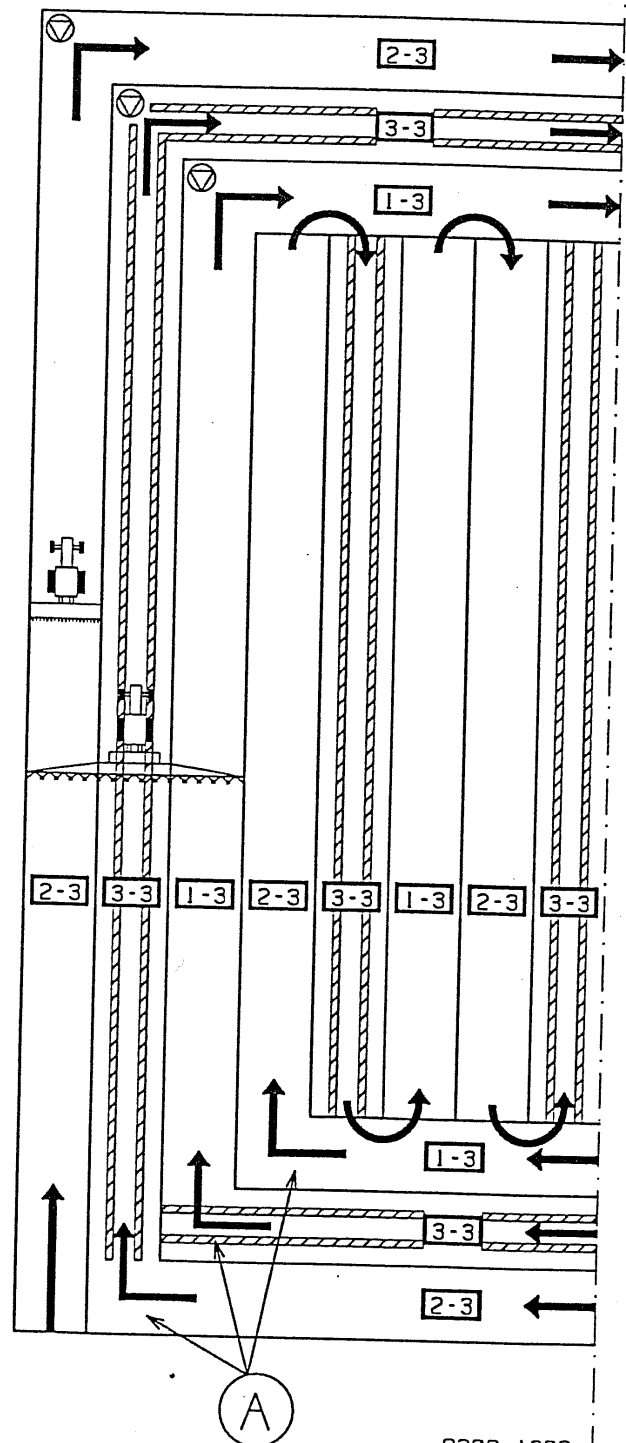Shows the time in hours:minutes:seconds.

DATE:
Shows the date in day:month:year.

By pressing the **"RETURN KEY"** you will return to the menu for the functions that can be selected.

CHOICE OF TRACK METHOD:

To meet the wishes of the various markets and requirements regarding control of tramlining LH 5000 has two different ways (A and B), to control tramlining. Which method to be used is chosen under encoding.

METHOD B:

This method is the traditional and most used. When actual running track is equal to track number tramlines are made.

EXAMPLE OF METHOD B UNEVEN:

In the example shown a rhythm of 3 is encoded. 2x2 magnet flaps or 2 couplings are mounted on the middle of the machine.

Tramlines are made when actual running tracks are equal to the encoded rhythm (track number). For the first 3 rounds driven in the field you have to be attentive to where actual running tracks are to be counted (A), and especially where actual running tracks are not to be counted (all other corners).

The counting can be controlled by means of the "HOLD" key or the "TRACK+/-" keys.
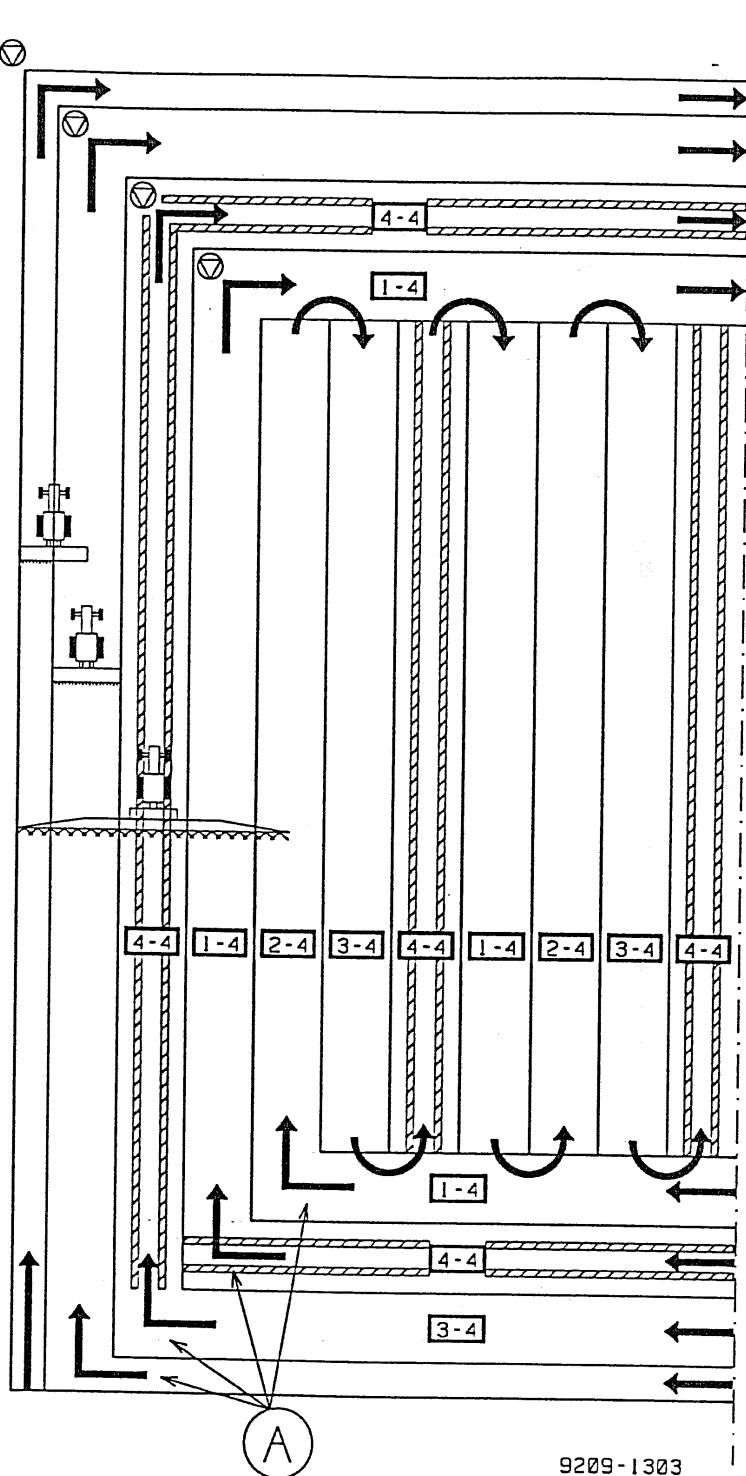
9209-1302

EXAMPLE OF METHOD B EVEN:

In the example shown a rhythm (track number) of 4 is encoded. At this method the tramline can- not be divided to 2 running tracks. There- fore you have to drive one round in the field with half the seed drill closed. 2x2 magnet flaps or 2 couplings are mounted on the middle of the machine.

Tramlines are made when actual running tracks are equal to the encoded rhythm (track number). For the first 4 rounds driven in the field you have to be attentive to where actual running tracks are to be counted (A), and especially where actual running tracks are not to be counted (all other corners).

The counting can be con- trolled by means of the "HOLD" key or the "TRACK + /-" keys.

9209-1303

METHOD A:

If it is a question of uneven rhythm (track number) as shown in the example there is hardly any difference of method A and B. The only difference is when tramlines are made. Method A makes tramlines in the middle of the rhythm, see the example.
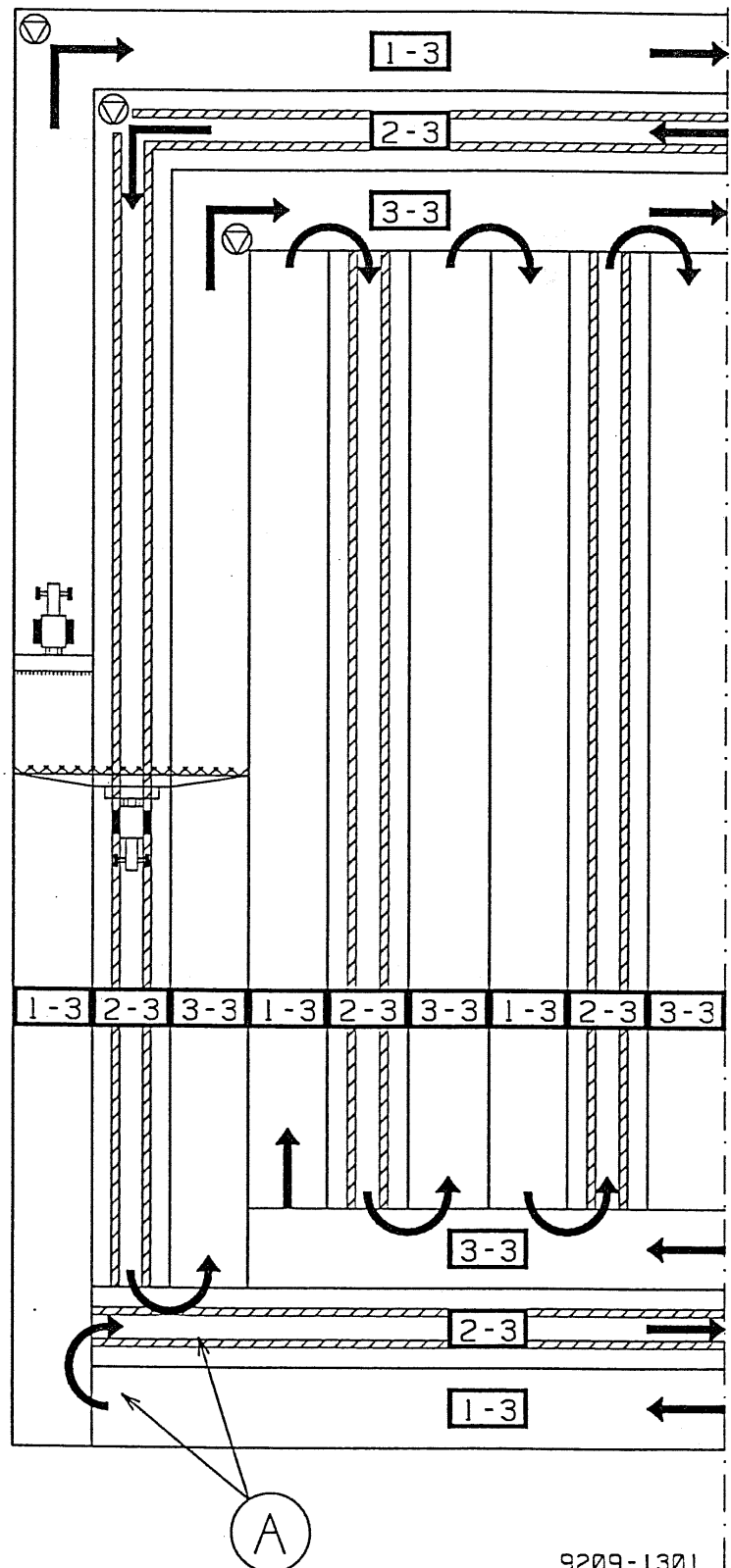
EXAMPLE OF METHOD A UNEVEN:

In the example shown a rhythm of 3 is encoded. 2x2 magnet flaps or 2 couplings are mounted on the middle of the machine.

Tramlines are made in running track 2 when a rhythm (track number) of 3 is encoded.

For the first 3 rounds driven around the whole field you have to be attentive to where actual running tracks are to be counted (A), and especially where actual running tracks are not to be counted (all other corners). You have to turn around and drive the other way after each round.

The counting can be controlled by means of the "HOLD" key or the "TRACK +/-" keys.

9209-1301

EXAMPLE OF METHOD A EVEN:

In the example shown a rhythm (track number) of 4 is encoded. 1x2 magnet flaps or 1 coupling is mounted at the left side of the machine.

Tramlines are made in running track 2 and 3 (divided) when a rhythm (track number) of 4 is encoded.

For the first rounds driven around the whole field you have to be attentive to where actual running tracks are to be counted (A), and especially where actual running tracks are not to be counted (all other corners). You have to turn around and drive the other way after each round.

The counting can be controlled by means of the "HOLD" key or the "TRACK +/-" keys.

9209-1300
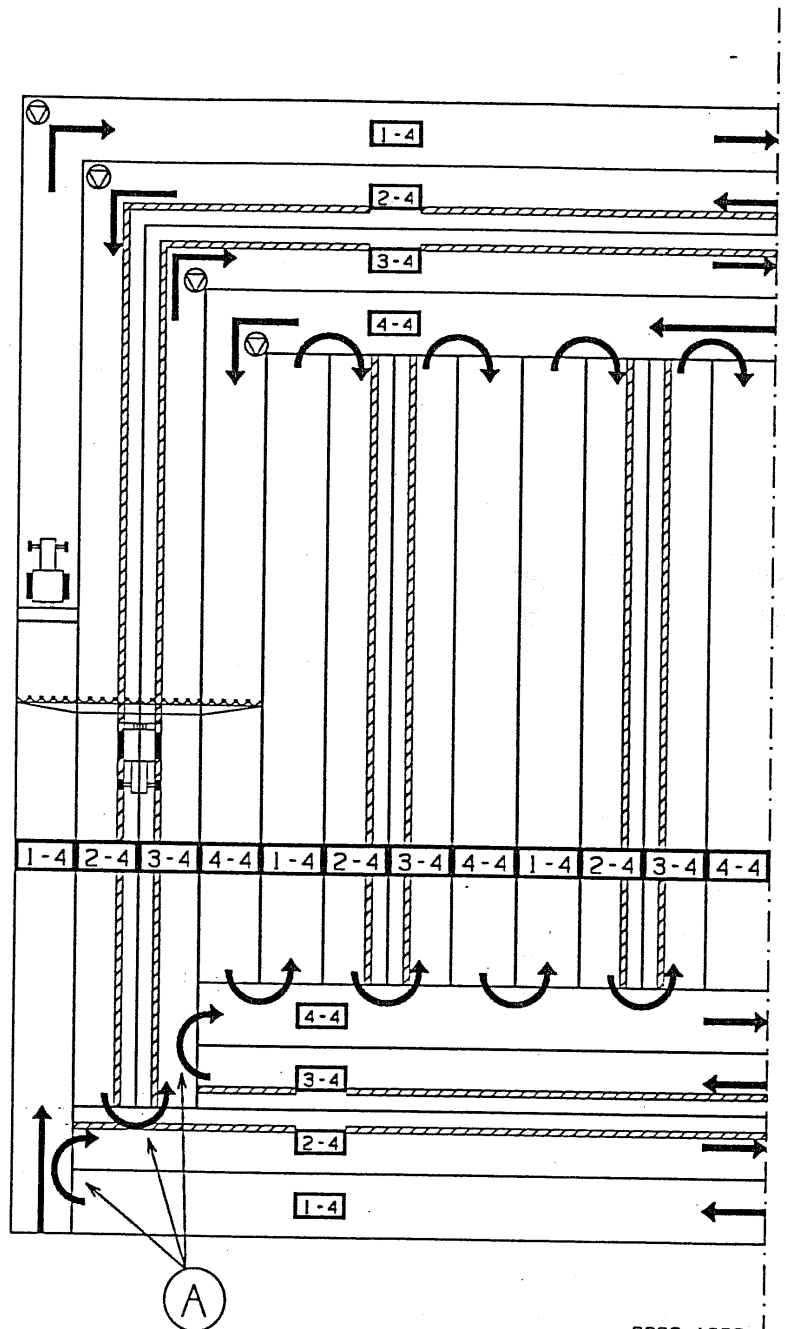
SEED DRILL ENCODING:

In this menu the values necessary for sowing are encoded. Each implement has its own set of encoding values. Even encoding values as wheel circumference, alarms, radar on/off etc. have a separate value under each implement.
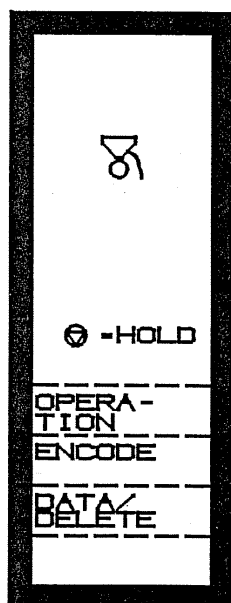
Therefore you always have to check these encoding values after each shift of implement.

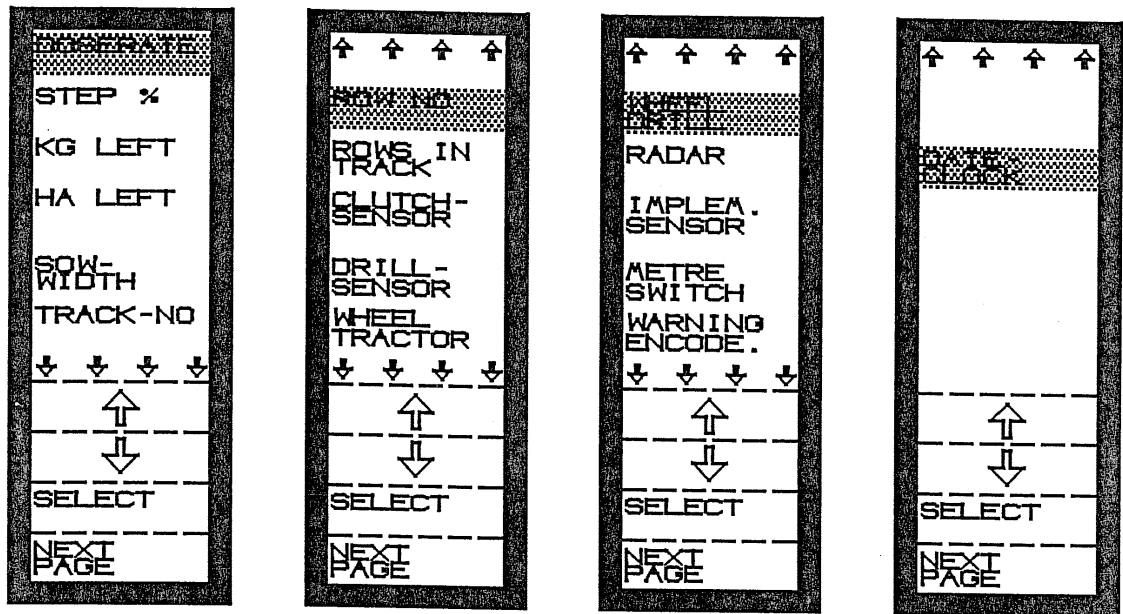Seed drill encoding is chosen as follows:
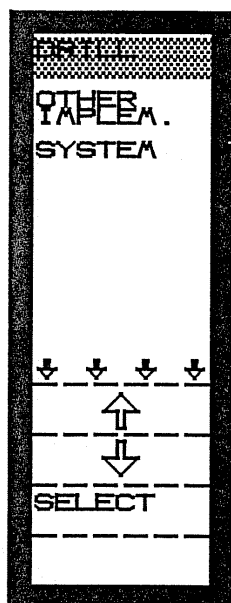
1. Move the cursor to "SEED DRILL" by means of the arrow keys.

2. Press the function key "SELECT".

Then the following picture is shown;

Press the function key "ENCODE".

Then the following 4 pictures are shown, the pages are turned with the function key **"NEXT PAGE"**.

DOSE-RATE	↑ ↑ ↑ ↑	↑ ↑ ↑ ↑	↑ ↑ ↑ ↑
STEP %	SOWING	NETTE	
KG LEFT	ROWS IN TRACK	RADAR	WATER CLOCK
HA LEFT	CLUTCH-SENSOR	IMPLEM. SENSOR	
SOW-WIDTH	DRILL-SENSOR	METRE SWITCH	
TRACK-NO	WHEEL TRACTOR	WARNING ENCODE.	
↓ ↓ ↓ ↓	↓ ↓ ↓ ↓	↓ ↓ ↓ ↓	
⇧	⇧	⇧	⇧
⇩	⇩	⇩	⇩
SELECT	SELECT	SELECT	SELECT
NEXT PAGE	NEXT PAGE	NEXT PAGE	NEXT PAGE

The individual encodings will in the following be gone through one by one.

DOSE RATE:

DOSE-RATE
230 KG/HA
CALIB.
LOAD FIGURE

DOSE RATE

CALIBRATION

LOAD FIGURE

DOSE RATE:
Here the requested dosing in kilos per hectare is encoded.

CALIBRATION:
You shift to calibration by pressing this key.

LOAD FIGURE:
By pressing this key you shift to a new picture, making it possible to encode
"GRAMMES/PULSE" directly.

Start to encode the dosing wanted
**Before calibration the total working width of the seed drill has to be encoded.**

NB!
If the encoded sowing width is zero the programme automatically shifts to encoding of sowing width. (Remember that the effective sowing width has to be encoded in centimeters). Return by pressing the **"RETURN KEY"**.

CALIBRATION:
The calibration is the basis of the automatic control of the seed drill. The exactness of the subsequent control will depend completely on the calibration.

After pressure of **"CALIBRATION"** the following picture is shown:

```
PREPARE
DRILL



PRE
CALIB.




```
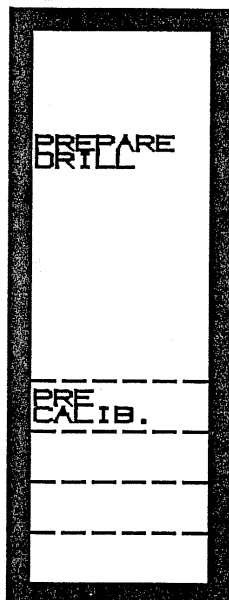
ATTENTION!
When pressing the "PRE CALIB", the sowing shaft revolves.

Before pressing the **"PRE CALIB"** the seed drill must be filled up and the equipment for collecting the calibration quantity be ready.

By pressing **"PRE CALIB"** the sowing shaft revolves for 10 seconds and thus ensures that the seed wheels are filled before start. **(Remember to empty the collecting equipment again).**

Then the following picture is shown:

```
LOAD FIG
  1.1364



NO. OF
PULSES
      105

NO. OF
CALIB.

      0

CALIB.




```
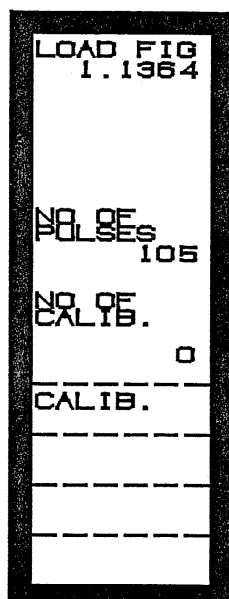
LOAD FIGURE
The last found load figure.

NUMBER OF PULSES
Here the number of pulses during calibration is counted.
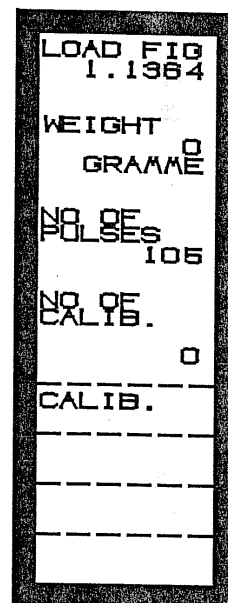
NUMBER OF CALIBRATIONS
Shows the number of calibrations.
By pressure on "CALIBRATION" the sowing shaft revolves for 10 seconds. By repeated pressure the number of calibrations can be increased. This makes it possible to vary the quantity and thus the weight of the calibration sample, which makes the weighing as perfect as possible, considering the type of weight available.

By pressing **"CALIBRATION"** the following picture is shown:
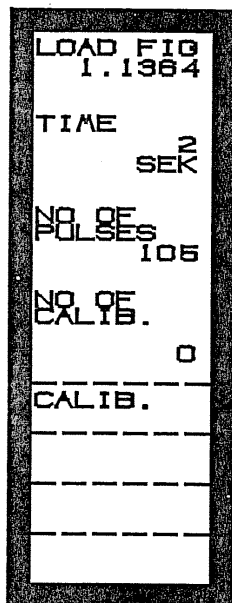
```
┌──────────────┐          After rotation of the          ┌──────────────┐
│ LOAD FIG     │          sowing shaft the number        │ LOAD FIG     │
│    1.1364    │          of seconds chosen, the         │    1.1364    │
│ TIME         │          picture shifts to the          │ WEIGHT       │
│         2    │          following:                     │         0    │
│      SEK     │                                         │    GRAMME    │
│ NO. OF       │                                         │ NO. OF       │
│ PULSES       │                                         │ PULSES       │
│        105   │                                         │        105   │
│ NO. OF       │                                         │ NO. OF       │
│ CALIB.       │                                         │ CALIB.       │
│         0    │                                         │         0    │
│ CALIB.       │                                         │ CALIB.       │
│ ──── ─ ─     │                                         │ ──── ─ ─     │
│ ──── ─ ─     │                                         │ ──── ─ ─     │
│ ──── ─ ─     │                                         │ ──── ─ ─     │
└──────────────┘                                         └──────────────┘
```

1. The weight of the calibration sample (in grams) is encoded under **"WEIGHT"**.

2. **"CALC"** starts to flash.

3. By pressing **"CALC"** the new weighing number is calculated and shown at top of the screen.

4. The calibration is now finished and you return to encoding by means of the **"RETURN KEY"**.

STEP %

The size of each step in the step dosing. This %-value is the same for both + and -.

KG REST:

In order to see how much is left in the seed hopper the quantity filled is entered here.
If there is a remaining quantity in the seed hopper when filled up, this remaining quantity has to be added to the new filling quantity as follows:

Old remaining quantity + filling quantity = remaining kos. (seed hopper contents).

HA LEFT:

Here the size of the field is entered before start. From this encoding also final - time is calculated.

SOW WIDTH:

Here the total working width of the seed drill is encoded in centimeters.

TRACK -NUMBER:

Here the tramlining rhythm is encoded.

Example: Working width of the seed drill = 3 meter
           Working width of the spreader = 15 meter
           Track number = 15/3 = 5

You also have to choose which method (A or B) is wanted when you want to make tramlines. The two methods are described under "OPERATION" (Normal = B).

ROW NO.:

Here you encode the total number of rows (sowing tubes), with which the drill is equipped.

ROWS IN TRACK:

Here you encode the total number of rows (sowing tubes) which are shut when making tramlines. This encoding is necessary to obtain a correct quantity measurement. If the sown quantity is not reduced when making tramlines, 0 is encoded.

NB!   By pneumatic seed drill the quantity is not reduced when tramlines are made.

CLUTCH SENSOR:

Here you choose whether it is a traditional seed drill or a pneumatic drill.
If it is a pneumatic drill choose RPM "ON".

For seed drills mounted with tramlining couplings CLUTCH SENSOR is chosen. At the same time number of pulses per revolution is encoded (normal value = 12).

DRILL SENSOR:

Here the number of pulses per revolution for sowing shaft sensore is encoded (normal value = 12).

CHOICE OF SPEED SENSOR:

A speed sensor is mounted on the seed drill, giving the number of impulses suitable for the control. Out of regard for the future the choices "RADAR" and "WHEEL TRACTOR" are also available in the programme.

1. "RADAR".   (normal value = off).
2. "WHEEL SEED DRILL"   (Normally used during sowing).
3. "WHEEL TRACTOR"   (Normally not used during sowing).

WHEEL SEED DRILL:

Here the distance in cm is encoded, which are run per impulse from the speed sensor.

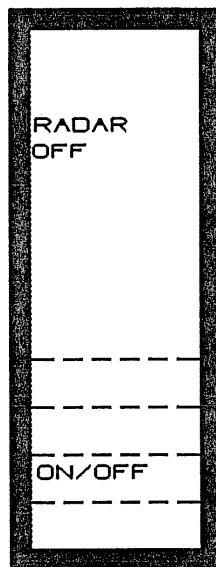LH 5000 is provided with an automatic speed calibration.

Procedure:

1. Measure a distance of 100 meters and drive ahead to the start mark.
2. Press on "CALC" to start the pulse counter.
3. Drive the 100 meters and stop exactly at the stop mark.
4. Press on "CALC WHEEL" and the wheel circumference is calculated.

WHEEL TRACTOR:
Use the same calibration method as for **WHEEL DRILL.**

RADAR:

RADAR
OFF

If you want to use radar, radar is put "ON".
Shift between on and off by repeated pressure
on the function key "ON/OFF".

ON/OFF

NB! When radar is not used, put radar "OFF".

RADAR ON:
If radar is used the number of impulses per meter has to be encoded. As for
"WHEEL DRILL" "radar" also has an automatic calibration routine. The
calibration method is the same for both types of speed sensors.

IMPLEMENT SENSOR:
The implement sensor is the sensor to start and stop the area meter and to
count track numbers. It is possible to choose between LIFT or DRILL.
Normally the implement signal will come from a sensor mounted on the seed
drill (choose "DRILL").

METRE SWITCH
Here you choose whether distance measurement shall be started/stopped
manually (choose **"MANUAL"**). Or by the chosen implement sensor (choose
"IMPLEMENT SENSOR"), for drill.

ALARMS: (Warning encode)

The following alarm is a fixed alarm, i.e. it cannot be put "OFF".

```
WARN.

DOSE
AREA

WANTET
        230
ACTUEL
        TOO
        LOW

OK  — — — —

    — — — —

    — — — —

    — — — —
```
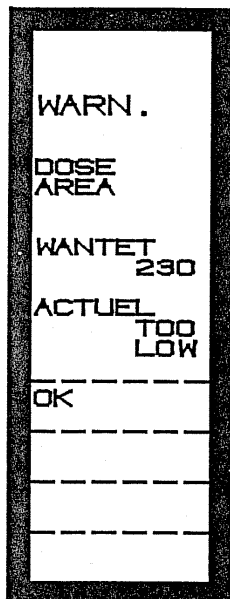
NB: Be aware that sowing shaft electric motor is stopped when the alarm picture is shown.

Causes for errors:

A foreign body is blocking the sowing shaft.

The chosen dosing/speed is outside the adjusting area.

The battery voltage is too low.

To avoid missed areas in the field it is necessary to lift the drill and back to the spot where the sowing stopped.

The following alarms can all be put ON/OFF:

PTO: MAX/MIN-limits for revolutions for PTO.
KM/T: MAX/MIN-limits for speed.
SLIP: MAX-limits for wheelslip in percentage.
KG LEFT: KOS. remaining in the hopper when alarm is to be given.
D SHAFT: Alarm for stop on sowing shaft.
HOPPER TANK: Alarm for empty seed hopper.
RPM: MAX/MIN-limits for revolutions on blower.

If chosen in encoding:

CLUTCH SENSOR:
Alarm if the clutches (the couplings) for making tramlines do not function.

DATE-CLOCK:
Here the following is adjusted/encoded:

HOURS - MINUTES - YEAR - MONTH - DAY.

SEED DRILL DATA/DELETE:

In this function the following possibilities are available:

1.   To read total counters (cannot be found other places).
2.   To read trip counters.
3.   To reset counters individually.
4.   To reset all trip counters at one time (typically used when shifting field).

If you want to reset all trip counters at one time, just press the function key "DELETE TRIP".
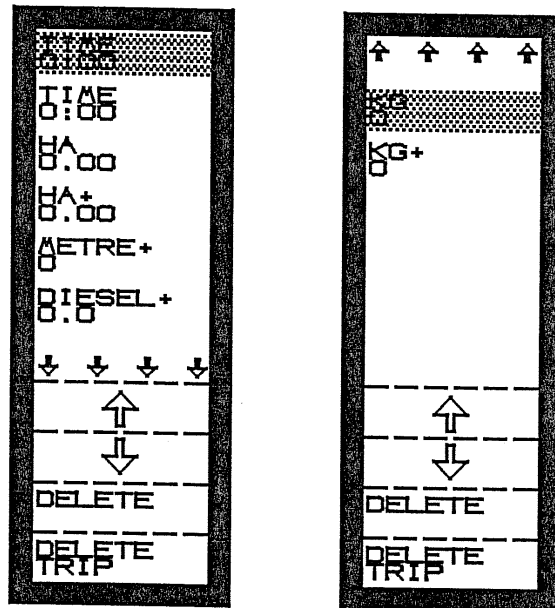
If you want to reset the total counters, or to reset the trip counters individually, the cursor (the dark field) is by means of the arrow keys moved to the counter, which is wanted reset, then press the function key "DELETE".

TRIP/TOTAL COUNTERS:

TIME: Trip counter for time consumed since last reset.

TIME +:   Total counter for time consumed since last reset.
            Notice: This counter can only be found in "DATA/DELETE" and cannot be chosen in "OPERATION".

HA: Trip counter for worked area since reset.

HA +:   Total counter for worked area since reset.
            Notice: This counter can only be found in "DATA/DELETE" and cannot be chosen in "OPERATION".

METER +:   Driven distance in meter since reset.
            To be deleted as total counters.

DIESEL +: Diesel consumption since reset.
To be deleted as total counters.
Notice: This counter can only be found in "DATA/DELETE" and cannot be chosen in "OPERATION".

KG: Total counter for sowing quantity since last reset.
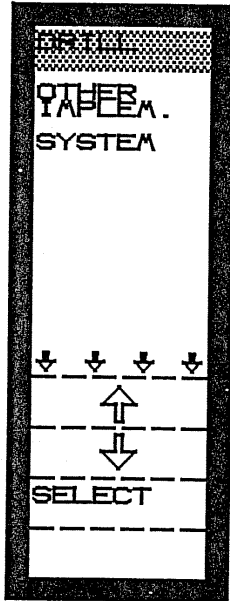
KG +: Total counter for sowing quantity since last reset.
Notice: This counter can only be found in "DATA/DELETE" and cannot be chosen in "OPERATION".

Other implements

OTHER IMPLEMENT

From the basic menu **"Other implement"** is chosen as follows:

1. Move the cursor (the black field) to "**Other implement**", by means of the arrow keys.

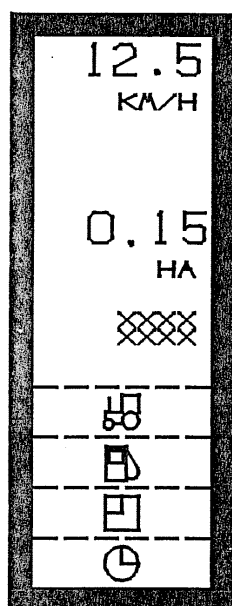2. Press the function key **"SELECT"**.

Then the following picture is shown:
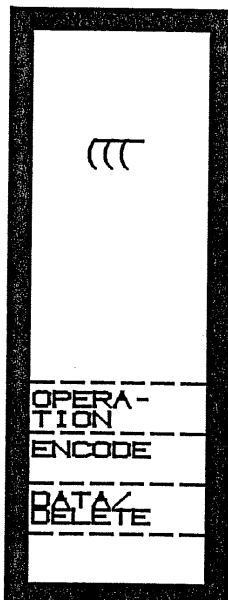
Press the function key **"OPERATION"**.

It is possible to choose between the functions shown. The possibilities will be gone through on the following pages.

FIRM FUNCTIONS:

```
12.5
KM/H

0.15
HA

XXXX
```

SPEED:
As the primary function under other implement speed is chosen. The speed is shown in kilometers per hour with 1 decimal. The speed is calculated from the sensor, which has been chosen in encoding (wheel tractor or radar).

AREA:
The area is measured in hectares. The area is shown with 2 decimals from 0 - 99.99 HA and then with 1 decimal from 100 - 999.9.

NB: In **DATA/DELETE** you can find a total counter for area.

NB: Remember to reset the counters in **"DATA/DELETE"** before starting.

OPTIONAL FUNCTIONS:

At the bottom of the screen a symbol is shown for each of the four function keys. Available functions are shown by pressing the key.

TRACTOR FUNCTION:

```
SLIP

PTO

METRE

BATT.
```

SLIP	=	Wheel slip
PTO	=	Revolutions on PTO shaft
DIST	=	Run distance
BATT	=	Battery voltage

Slip:
Wheel slip in percent. Shows the relation between speed measured on wheel or drive shaft and speed measured with radar. This function is only active if the radar is installed and turned on ("ON") in encoding.

PTO:
Shows revolutions per minute on the power-take-off. This function is only active when revolution sensor is fitted.
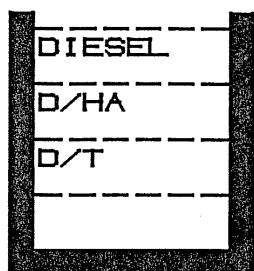
DIST:
Shows run distance measured in meters. Is measured from the chosen speed sensor. Is started and stopped by implement sensor or manual pressure on "DIST" (to be chosen under encoding).

BATT:
Shows the supply voltage for the computer.
When pressing **"RETURN KEY"** you can return to the menu for the optional functions.

DIESEL FUNCTIONS:

```
┌─────────────┐
│ DIESEL      │
│ D/HA        │
│ D/T         │
│             │
└─────────────┘
```

DIESEL: Fuel consumed in litres.

**D/HA:** Fuel consumption per hectare.

D/T: Fuel consumption per hour.

DIESEL: Fuel consumed in litres since last reset. The function works as total counter and reset/delete in the **"DATA/DELETE"** function.

D/HA: Present consumption of fuel per hectare. The function is used to optimize driving.

D/T: Present consumption of fuel per hour. The function is used to optimize driving.

By pressing the **"RETURN KEY"** you will return to the menu for the functions that can be selected.

AREA FUNCTION:

```
┌─────────────┐
│ HA/H        │
│ HA          │
│ HA          │
│ LEFT        │
└─────────────┘
```
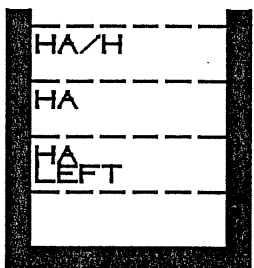
HA/T = Driving efficiency

HA = Area

HA LEFT = Remaning area

HA/T:
Driving efficiency. Shows how large an area you sow per hour with the present speed and the implement in question.
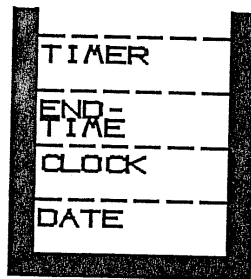
HA:
Area counter. Shows the sowed area in hectares since last reset.

HA LEFT:
Shows the remaining area - it is a necessity that the size of the field has been encoded before start.

By pressing the **"RETURN KEY"** you will return to the menu for the functions that can be selected.

TIME FUNCTION:

STOPUR	=	Working time in hours and minutes.
SLUTTID	=	The final time of the work.
UR	=	The time in hours:minutes:seconds

DATO = Day:month:year

STOPUR:
Is used to measure the time for a certain job. The stop watch is stopped and started manually.

SLUTTID:
Shows when the actual job can be expected to be finished, calculated from the present driving efficiency and the encoded remaining area.

UR:
Shows the time in hours: minutes:seconds.

DATO:
Shows the date in day:month:year.

By pressing the **"RETURN KEY"** you will return to the menu for the functions that can be selected.

OTHER IMPLEMENT ENCODING

The values necessary for other implements are to be encoded in this menu. Each implement has its own set of encoding values. The encoding values such as wheel circumference, alarms, radar on/off etc have a separate value for each implement.

These encoding values have therefore to be checked after each change of implement.
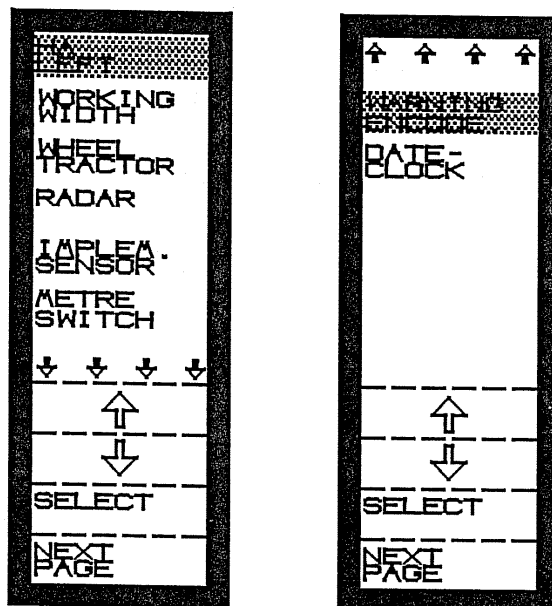
HA REST: Here the size of the field is to be encoded before start. From this encoding the final time is calculated too.

**WORKING-
WIDTH:**   The effective working width of the implement in cm.

WHEEL TRACTOR:

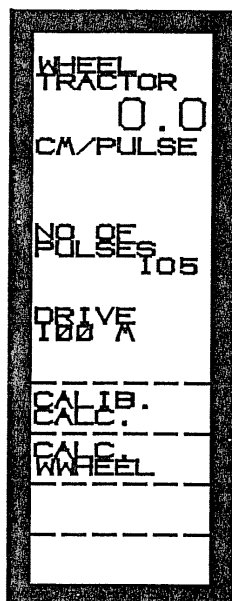Here the distance done in cm per impulse from the speed sensor is encoded.

Depending on which tractor is used the speed signal can come from a sensor built in the gear box of the tractor, from a sensor mounted at the drive shaft (4-wheel drive), or from a sensor mounted at one of the wheels.

LH 5000 is provided with an automatic speed calibration to be used with the built-in sensors. It can also be used with ordinary wheel sensors, if the wheel circumference divided by number of magnets *does not* exceed 100 cm.

NB! Always mount sufficient magnets in the wheel so that the encoding value does not exceed 100 cm.

AUTOMATIC CALIBRATION

CALIBRATE: If this key is pressed the picture is shown as to the left.

```
WHEEL
TRACTOR
      0.0
CM/PULSE

NO OF
PULSES
      105

DRIVE
100 M

CALIB. _ _ _
CALC. _ _ _

CALC.
WHEEL _ _ _

      _ _ _ _
```

Procedure:

1: Measure a distance of 100 m and drive forward to the "start" mark.

2: Press "CALIBRATE" to reset the impulse counter.

3: Drive the 100 m and stop **exactly** at the "STOP" mark.

4: If the computer has got sufficient impulses (more than 100 on 100 m) the "CALC.WHEEL" flashes. Press this key and the calibration is ended. The calculated encoding value is shown at top of the display.

If the computer has *not* received more than 100 impulses when driving the 100 m one of the following 2 possibilities can be used:

a: Manual measurement of the encoding value as described below.

b: Mounting of more magnets to increase the number of impulses for 100 m.

REMEMBER! It is very important that the distance between the magnets are equal - if not the reading of the speed will be eratic.

MANUAL CALIBRATION

MEASURING THE WHEEL CIRCUMFERENCE:

1: A mark is made in the field and on the tyre.

2: Then run the wheel 10 turns.

3: Place a second mark in the field.

4: The distance between the two marks is measured and divided by 10. The result is the effective wheel circumference (encoded in cm. Ex. 2,53 m is encoded as 253 cm)

5: The measured effective wheel circumference is divided by the number of magnets.

REMEMBER! to measure turns on the wheel on which the magnets are mounted.

RADAR:

```
RADAR
OFF




_____


_____

ON/OFF

_____
```
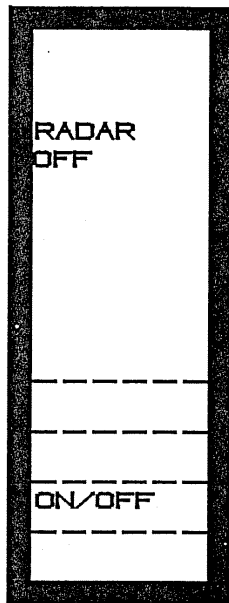
If you wish to use radar (if radar mounted) put radar "ON". At repeated pressure on RADAR ON/OFF you shift between on and off.
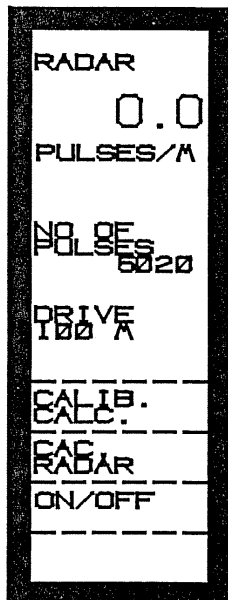
NB! If you do not want to use radar, put radar "OFF".

IMPORTANT!
At work in covering crops which can "wave" in the wind radar ought to be put off. If not errors in the measurement of speed can occur.

RADAR ON: Here number of pulses per meter coming from the **RADAR** is to be encoded.

AUTOMATIC CALIBRATION

```
RADAR

    0.0
PULSES/M

NO. OF
PULSES
       6020
DRIVE
100 M

_____
CALIB.
CALC.
_____
CAC
RADAR
_____
ON/OFF

_____
```

Same procedure as "WHEEL TRACTOR".
See automatic calibration.

If the computer has *not* received more than 5000 impulses at the driving through of the 100 meters, the pulses per meter can be measured and encoded manually.

MANUAL CALIBRATION

1. Measure a distance of about 50 meters.

2. Press on **CALIBRATE** at the starting mark to reset the pulse counter.

3. Drive the distance measured.

4. Read **NUMBER OF PULSES** on the display.

Calculate number of pulses per meter.

Pulses per meter = $\dfrac{\text{number of pulses}}{\text{measured distance}}$

NB!   The speed is calculated by the sensors in the following priority:

>   1.   **RADAR**
>   2.   **WHEEL TRACTOR**

If the speed is to be measured on **"Wheel tractor"** RADAR is put on *OFF*.

IMPLEMENT SENSOR:

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

In "OTHER IMPLEMENT" it is possible to choose between the following:

1.   **Lift**
2.   **PTO** (if the PTO sensor mounted)

DISTANCE SWITCH:

Here you choose whether distance is to be started/stopped manually "MANUAL" or by the chosen implement sensor "IMPLE-MENT SENSOR".

ALARMS:

PTO: Alarm **ON/OFF** and **MAX/MIN**-limits for revolutions.

KM/T: Alarm **ON/OFF** and **MAX/MIN**-limits for speed.

SLIP: Alarm **ON/OFF** and **MAX**-limits for wheel slip in percentage.

DATO-UR: Here the following is adjusted/encoded:

HOURS - MINUTES - YEAR - MONTH - DAY

OTHER IMPLEMENT - DATA/DELETE

In this function there are 3 *main-possibilities:*

1. **To read the total counter** (not to be found any where else)
   To read trip counter.

2. **To delete individual counters.**

3. **To delete all trip counters together.**

In the operating-menues it is not possible to see/elect the total counter. That is why **"DATA/DELETE"** is the only place these can be read.

By means of the arrow keys the "dark field" can be moved precisely to the counter you want to reset. The reset is executed by pressing **"DELETE"**.

If **"DELETE TRIP"** is pressed **all** trip counters are reset/deleted at one time.

The functions are as follows:
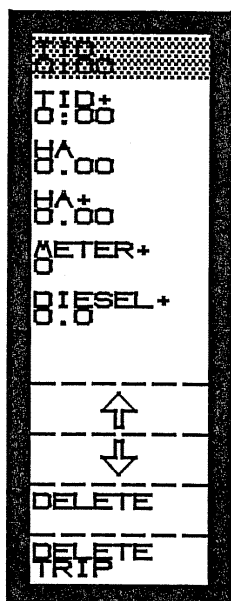
TID: Trip counter for consumed time since last reset.

TID +: Total counter for consumed time since last reset.

> **Note:** This counter **only exists** in **"DATA/DELETE"** and cannot be selected in **"DRIFT"**.

HA: Trip counter for sown area since reset.

HA +: Total counter for sown area since reset.

> **Note:** This counter **only exists** in **"DATA/DELETE"** and cannot be chosen in **"DRIFT"**.

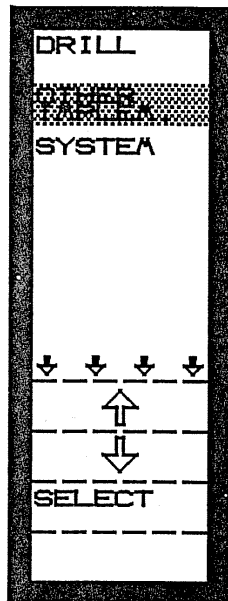**METER +:** Distance travelled in meters since reset. To be deleted as per total counter.

DIESEL +: Diesel consumption since reset. To be deleted as per total counter.

> **Note:** This counter **only exists** in **"DATA/DELETE"** and cannot be chosen in **"DRIFT"**.

System

SYSTEM

```
┌─────────────┐
│ DRILL       │
│ ▓▓▓▓▓▓▓     │
│ SYSTEM      │
│             │
│             │
│             │
│             │
│ ⇩  ⇩  ⇩  ⇩  │
│ ⇧           │
│ ⇩           │
│ SELECT      │
│             │
└─────────────┘
```
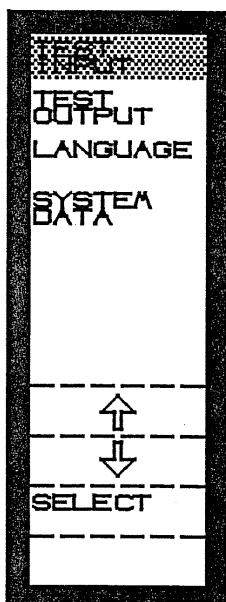
From the basic menu **"SYSTEM"** is chosen as follows:

1. Move the cursor (the dark field) to **"SYSTEM"** by means of the arrow keys.

2. Press the function key **"SELECT"**.

Then the following picture is shown:

```
┌─────────────┐
│ ▓▓▓▓▓▓▓     │
│ TEST        │
│ OUTPUT      │
│ LANGUAGE    │
│ SYSTEM      │
│ DATA        │
│             │
│ ⇧           │
│ ⇩           │
│ SELECT      │
│             │
└─────────────┘
```

TEST INPUT
Test of all entry points for the specific implement (sensors)

TEST OUTPUT
Test of all exits for the specific implement.

LANGUAGE
Here the required language is chosen.

SYSTEM DATA
This system is not available for users. It contains important system data, which the user is not allowed to change.

TEST INPUT:

For each type of entry there is a counter to the left side of the display registrating the impulses. To the right side the status of the individual entry is indicated (HI/LO).

1 to 5 are used for as well "SEED DRILL" as "OTHER IMPLEMENT".

```
RADAR
 0        HI
PTO
 0        HI
WHEEL
TRACTOR
 0        HI
DIESEL
 0        HI
IMPLEM.
 0        HI
TRAIL.  HI
 0
TRAIL.  2
 0       HI
TRAIL.  4
 0       LO
TRAIL.  7
 0       LO
TRAIL.  8
 0       LO
TRAIL. 15
 0       LO
TRAIL. 16
 0       LO
```

1. RADAR:
Signal from radar when you run slowly forward.

2. PTO:
Signal from PTO sensor when the PTO shaft turns.

3. WHEEL TRACTOR:
Signal from wheel sensor when driving slowly forward.

4. DIESEL:
Signal from diesel flow meter when diesel is consumed.

5. IMPLEMENT:
Signal when implement lifted - from the lift switch or sensor on the lift arms.

6 to 11 only used for "SEED DRILL"

6. ANH 1:
Signal from revolution sensor, mounted on sowing shaft.

7. ANH 2:
Signal from revolution sensor, mounted on electric motor.

8. ANH 4:
Signal from wheel sensor mounted on seed drill.

9. ANH 7:
Signal from implement switch mounted on seed drill.

10. ANH 8:
Signal from revolution sensor, mounted on blower or left tramline clutch (depending on machine type).

11. ANH 15:
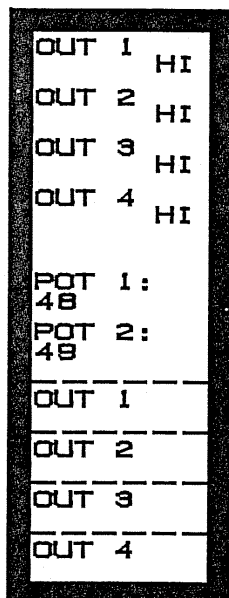Signal from hopper sensor.

12. ANH 16:
Signal from revolution sensor mounted on right tramline clutch (depending on machine type).

TEST OUTPUT:

Here the individual outlets can be tested (only used in connection with "SEED DRILL".

At top of the display the status of the individual outlets are shown.

POT 1 and **POT2** are not used.

```
OUT 1  HI
OUT 2  HI
OUT 3  HI
OUT 4  HI

POT 1:
48
POT 2:
48

OUT 1
OUT 2
OUT 3
OUT 4
```

OUT1:
Signal controlling tramlining (if the function key "OUT 1" is pressed pre-emergence tramlines will be made).

OUT2:
Signal controlling the revolution speed on the electric motor (if the function key "OUT2" is pressed the motor will run).

OUT3:
Is not used.

OUT4:
Is not used.

LANGUAGE:

Here you can choose between 6 different languages:

```
DANISK
DEUTSCH
ENGLISH
SVENSKA
FRANCAIS
HOLLANDS

⇧
⇩
SELECT
```

DANISH
GERMAN
ENGLISH
SWEDISH
FRENCH
DUTCH

By means of the arrow keys the cursor (the dark field) is placed on the language required, then press the function key **"SELECT"**.

SYSTEM ERROR MESSAGES:

LH 5000 has the following error messages built-in:

ALARM BATT:
Displays when the supply voltage to the computer is less than 10 volt. The error message is not removed until the supply voltage is above 10 volt again.
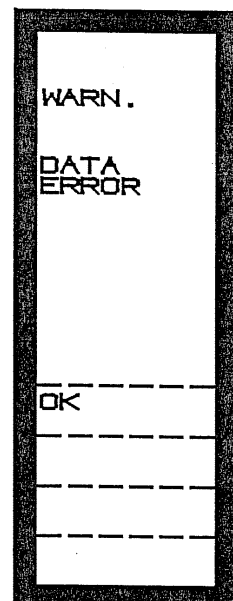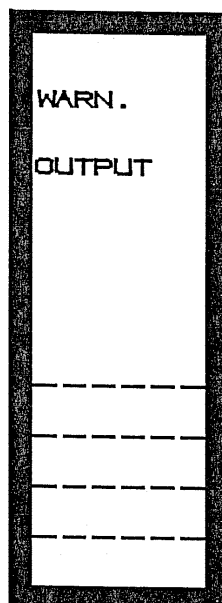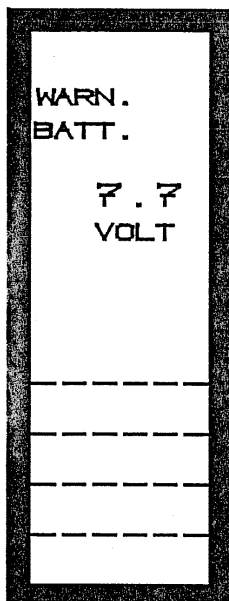
ALARM EXIT.
Displays if a short circuit on the cable to a controlling unit occurs (e.g. clutch) The error message does not disappear until the short circuit is removed.

ALARM DATA ERRORS:
Displays if an error arises in storage of data (the encoding values and values measured).

By pressing the **"RETURN KEY"** the error message can be removed. Then check all encoding values. If the error message occurs repeatedly the computer must be returned for checking.

```
WARN.
BATT.

  7.7
 VOLT


_ _ _ _ _
_ _ _ _ _
_ _ _ _ _
_ _ _ _ _
```

```
WARN.

OUTPUT



_ _ _ _ _
_ _ _ _ _
_ _ _ _ _
```

```
WARN.

DATA
ERROR



OK _ _ _ _
_ _ _ _ _
_ _ _ _ _
```

Mounting instruction

MOUNTING INSTRUCTION

The mounting instruction for LH 5000 seed drill computer describes the mounting of computer, bracket, electric supply mains, assembly box, and trailer socket. At the same tine the mounting of the additional equipment such as implement sensor and wheel sensor for tractor is described.

The system can be tailored according to requirements and is prepared for connection of the following equipment:

1.   Implement sensor lift.
2.   Wheel sensor for tractor.
3.   PTO sensor.
4.   Radar.
5.   Diesel flow meter.

GENERAL DRAWING

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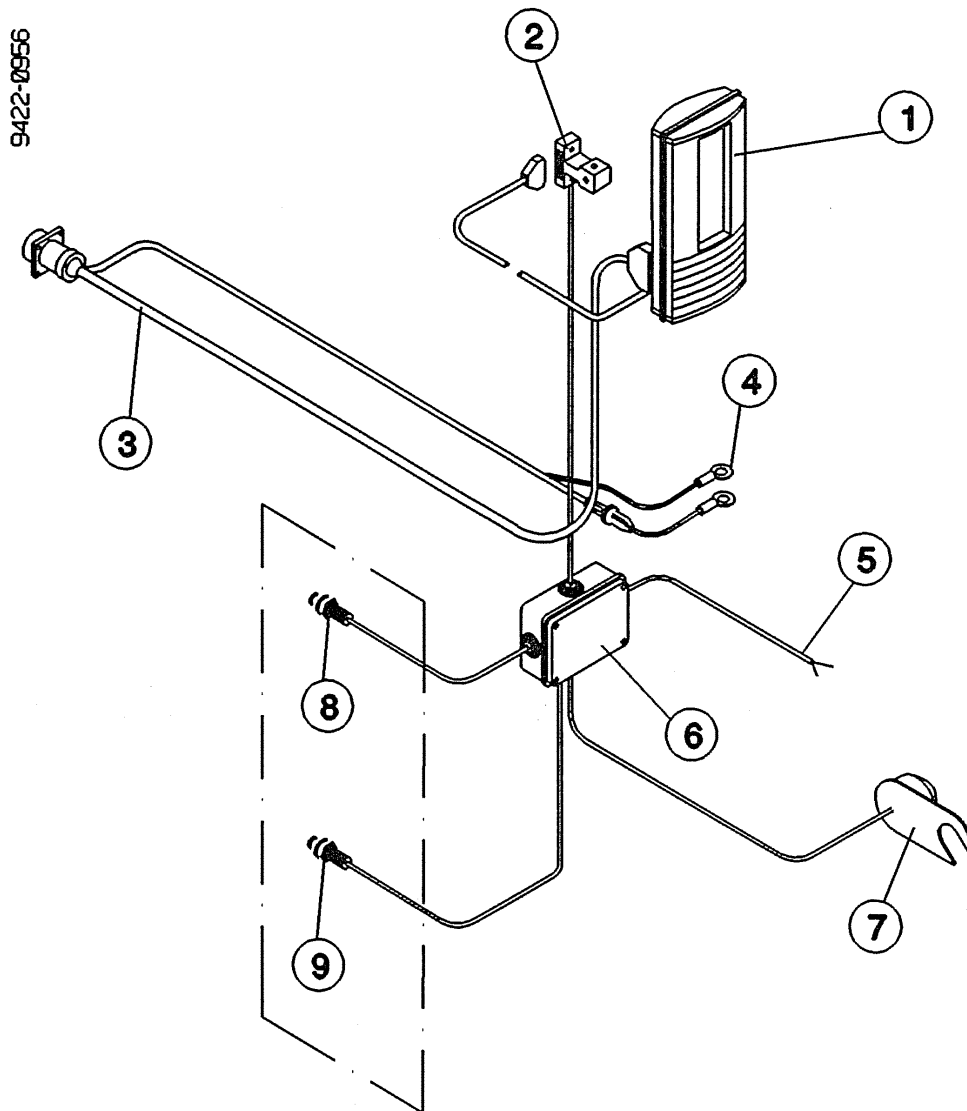
MOUNTING OF COMPUTER

The computer must be mounted within the driver's reach and visual field, normally on the right side of the tractor cab.

When placing the computer the following must be considered:

1. Can the bracket be fixed firmly enough, readability of the screen will be much reduced if the computer shakes.

2. Is there sufficient room at the back of the computer, where the tractor cable for the control of the seed drill has to be mounted (the system B socket).

9309-0825

B   A
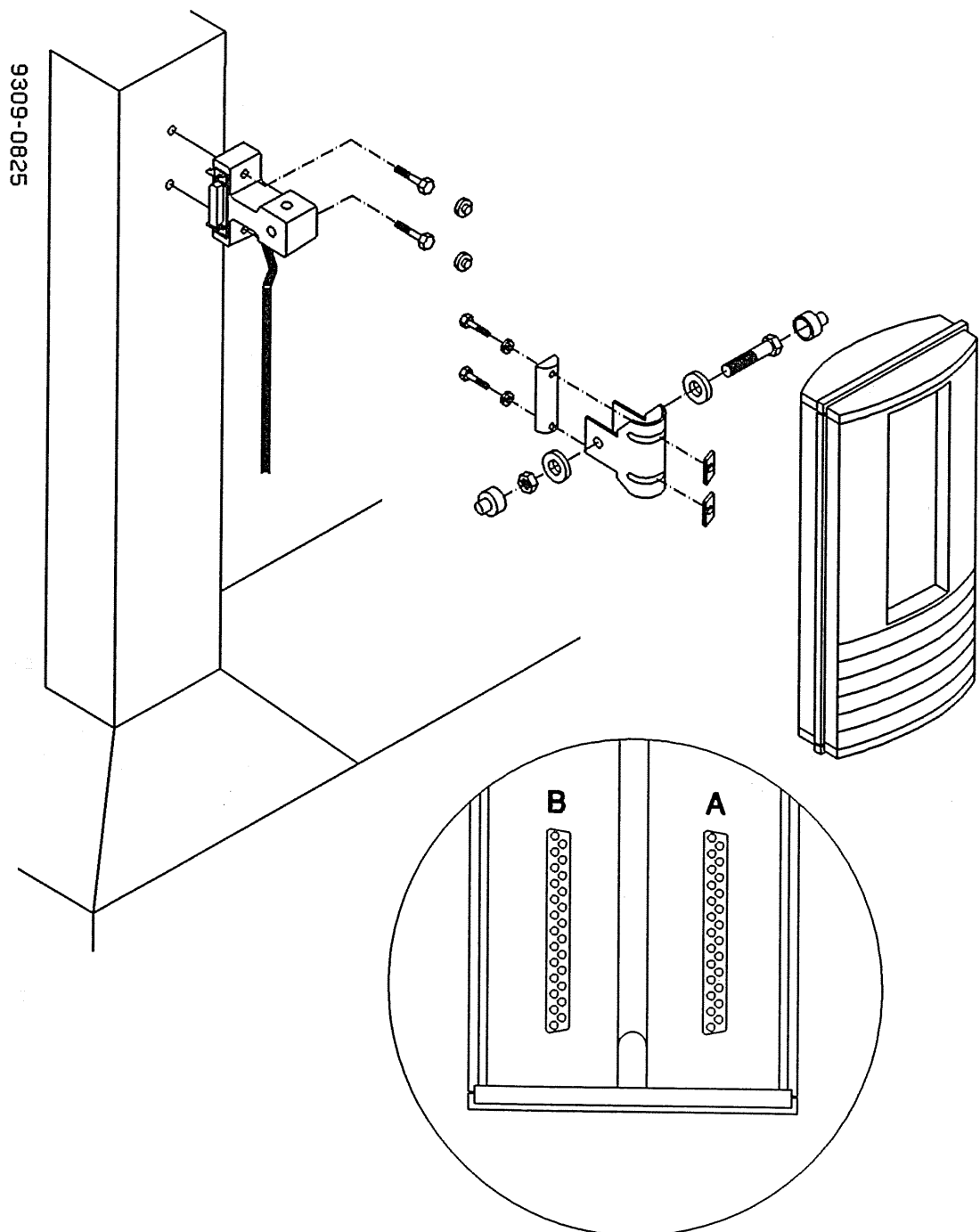
MOUNTING OF JUNCTION BOX

The placing of the assembly box depends on the tractor type. The box can be mounted inside or outside. When mounting moisture has to be considered.

The cutting of the rubber gromets at the cable lead-ins must be adjusted to the thickness of cable, and the cables must be long enough for a draining curve before entering the junction box.
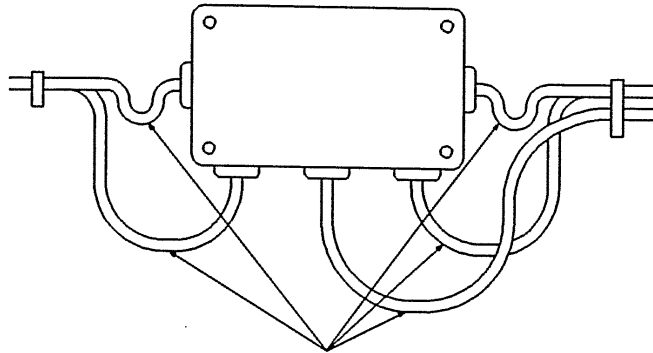

SUPPLY VOLTAGE:

The **LH 5000** system is divided in two circuits.

1.   One system provides the computer with additional sensors and the tramlining units (clutch or magnetic flap).

2.   The other system provides the seed drill control and power to the electric motor for the sowing shaft.

The computer with additional sensors and the tramlining units must cut out when the ignition is switched off. At full extent the system can reach a power consumption of about 5-6 ampere. If there is any doubt as to whether the ignition switch can stand this extra load a relay must be installed (additional equipment).
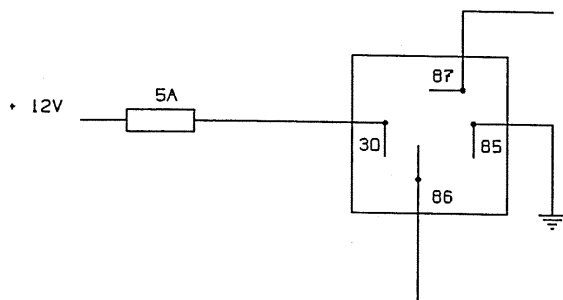
CIRCUIT DIAGRAM FOR JUNCTION BOX

In the mounting kit a self-adhesive label is supplied showing the connection of the individual parts to the assembly print. Stick the label on the inside of the lid of the box.

Terminal block 1:
Here the 14 conducted cable from the LH 5000 mounting bracket is mounted.

NOTE!
Only 13 of the 14 conductors in the cable are used, the excess can be cut off.

Terminal block 2:
At the points 1 to 7 the seven-core cable from the trailer socket is connected. The last 3 points are for the connection of radar.

Terminal block 3:
Here the supply voltage cable and the individual sensors (wheel sensor, PTO sensor etc.) are connected.

LH 5000			Trailer plug					
1	Grey	Tra. 1	1	White	Tra. 1	1	Blue	Diesel
2	Red	Tra. 2	2	Brown	Tra. 2	2	Brown	0 V
3	Brown	Mot. 1+	3	Green	Mot. 1+	3	Blue	Implement
4	Yellow	Tra. 4	4	Yellow	Tra. 4	4	Brown	0 V
5	Blue	Implement	5	Grey	0 V	5	Blue	+12 V
6	Pink	Diesel	6	Pink	+ 12 V	6	Black	PTO
7	Green	Tra. 7	7	Blue	Tra. 7	7	Brown	0 V
8	Violet	PTO	8	Red	+ 12 V	8		+12 V
9	Black	Radar	9	Green	Radar	9	Blue	Wheel
10	Grey/Pink	Wheel	10	Black Blue	0 V	10	Brown	0 V
11	White	+12 V				11	Blue	+12 V
12	Blue/Red White/green	0 V				12	Brown	0 V

FUSE 4A

FUSE 4A

POWER (column 11-12 right table)

LH AGRO

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MOUNTING OF TRACTOR CABLE FOR CONTROL OF SEED DRILL

Together with the seed drill you will receive a cable which is to form the connection between the system B-plug of the LH 5000 computer and the control of seed drill. The cable is also to provide the seed drill with power (20 to 30 ampere)

The cable is connected directly to the battery of the tractor:

1.   The black wires are connected 0V (earth)

2.   The heavy red wire is connected +12V through the supplied fuse holder.
     (A 25 amp. fuse is fitted).

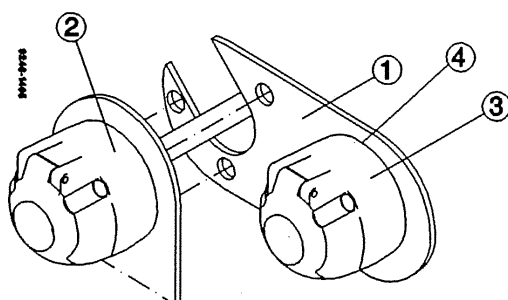3.   The thin red wire is connected directly to +12V.

CAUTION: Positive and negative must under no circumstances be exchanged!

(12b) Red   =   +12 volt.
(12a) Black   =   0 volt (earth).
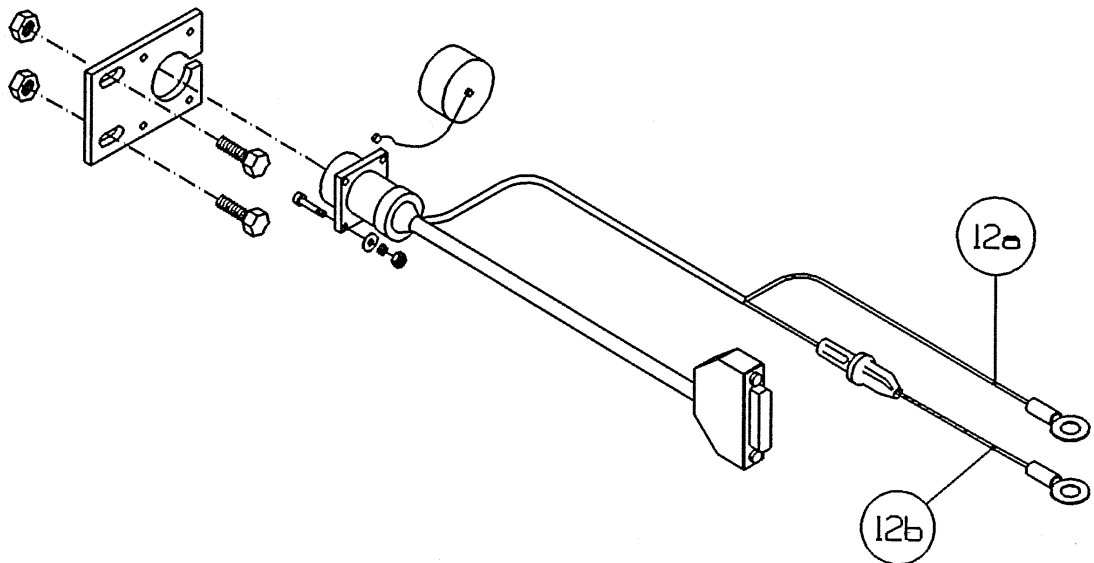
MOUNTING OF TRAILER SOCKET

The 7-pole trailer socket is mounted beside the corresponding socket for trailer. The socket supplied is of a type, which cannot be mixed up with the existing trailer socket.

MOUNTING OF ADDITIONAL EQUIPMENT

If you want to use "OTHER IMPLEMENT", e.g. for hectare and speed measurement, wheel and implement sensors have to be installed.

WHEEL SENSOR

1.   The wheel sensor is mounted on right rear wheel.

2.   2 magnets are mounted with equal intervals, if not the displayed speed will be eratic.

3.   The magnets can be glued e.g. on the hub bolts (glass/metal glue).

4.   Adjust the sensor and magnet gap to about 5 mm.
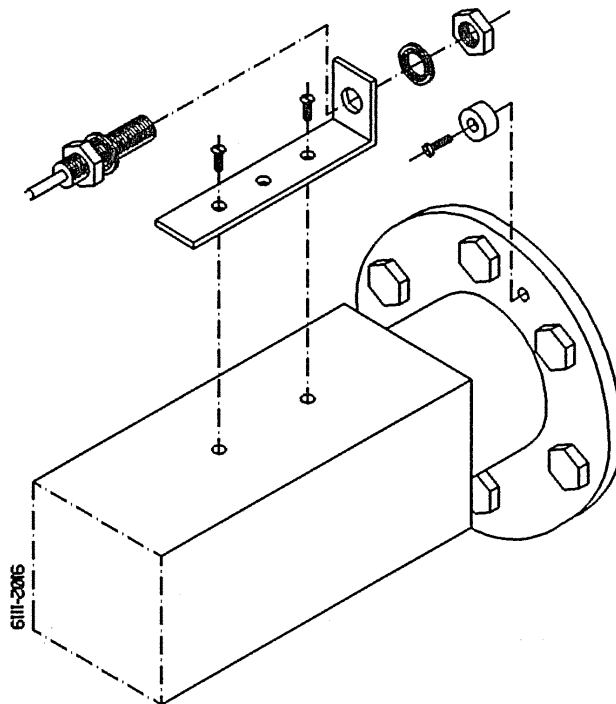
ATTENTION!   Do not clamp the sensor too hard.

IMPLEMENT SENSOR

The function of the implement sensor is to stop the area meters when the implement is not in the working position. As most implements are lifted out of work the most universal mounting is therefore on/at the lift arms.
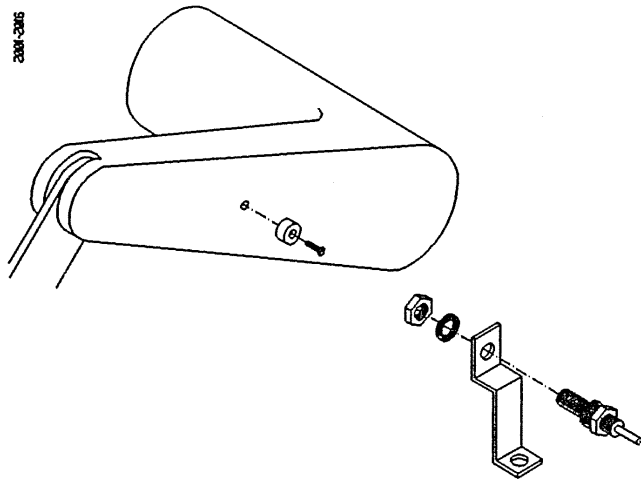
If you want to mount the sensor elsewhere be aware that the sensor requires a travel of about 50 mm to function satisfactory.

The area measuring is stopped when sensor is opposite the magnet.

1.   The magnet can be glued firmly on (glass/metal glue).
2.   Adjust the sensor and magnet gap to about 5 mm.