

## **Electro-Magnetic Compatibility (EMC)**

This product complies with Council Directive 89/336/EEC when installed and used in accordance with the relevant instructions.



## **Service and Technical Support**

PLEASE CONTACT YOUR LOCAL DISTRIBUTOR if unknown, then fax: 44 (0) 1453 733311 for details.

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Our policy is one of continuous improvement and the information in this document is subject to change without notice. Check that the software reference matches that displayed by the instrument.

Document number

S/DC/500-10-067 : Issue 12 : 3/6/99

\\UK067-12.DTP

# **User Guide.**

## **Ceres 2**

### **Calibration**

Software Ref: 406-543

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Calibration is done in each of three instrument modes

## Calibration in normal operating mode

Regular checks and adjustments as part of the operating routine include tare, and for each of up to nine different crops in a crop directory for,

- Harvest moisture content.
- Moisture content correction factor (for optional moisture sensor)
- Storage moisture content.
- Harvest density.
- Grain calibration.

*Refer to the operating instruction manual.*

## CAL mode 1

Settings (mostly made on installation only) for,

- Forward speed.
- Compensating for cross-slopes
- Cutter width/part widths.
- Grain elevator throughput.
- Data logging.
- Language.
- Time.

## CAL mode 2

Settings (mostly made on installation only) for,

- Continuous moisture sensor.
- Exceptionally wet crops.
- Tons/bushel weight.
- Temperature.

## Calibration tables

Some calibration factors are determined in an ongoing test programme where various grain types are metered through a range of combine makes and models at different rates, and on various cross-slopes.


*Refer to the calibration table for your combine.*

The recommended values are based on data from more than one of each combine model. Some slight adjustments are necessary in individual circumstances, if weighbridge readings highlight consistent discrepancies in *Ceres* weight readings.

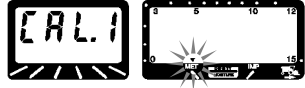
# Enter/store/print data

## Entering CAL mode.

Overlay cards are provided, re-defining the button functions in CAL modes 1 and 2

- 1 Select metric or imperial units in normal operating mode.
- 2 Switch off.
- 3 Position the appropriate overlay card.
- 4 Hold  and switch on.

RH display indicates units selected.

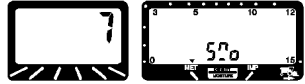


## Entering data

### Numeric

- 1 Select function button.

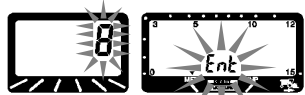
LH display shows current value.  
RH digital display indicates function and units selected e.g.



(Smoothing factor)

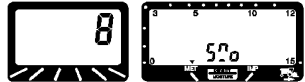
- 2 Enter new value.

If you make a mistake, continue and repeat the correct number sequence.



- 3 Press to accept.

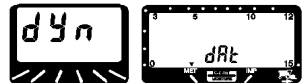
LH display shows new setting.



### Non-numeric

- 1 Select function button.

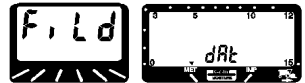
LH display shows current option.  
RH digital display indicates function selected e.g.



(Data logging mode)

- 2 Press button again to select option.

LH display shows new setting.

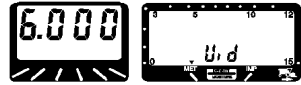


# Enter/store/print data

## Secondary data

Some functions have secondary data which can be numeric or non-numeric.

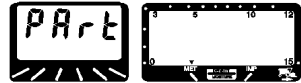
- 1 Select function button.



(Cutting width)

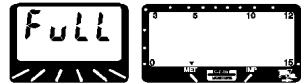
- 2 Hold button.

Secondary data selected.



- 3 Release button and press again to select option.  
(or enter new numeric value)

LH display shows new setting.



## Storing data

The full set of data is stored in **current** memory but can also be saved in a separate **backup** memory. This can be **restored** at any time and overwrites data in the current memory.

Two sets of data can also be **exchanged** between the current and backup memory, a handy feature if *Ceres* is swapped between two machines.

- 1 Enter CAL mode 1



- 2 Press.

- 3 To change option.



(Store)

(Restore)

(Exchange)

- 4 Hold.



Data is now transferred.



# Enter/store/print data

---

## Printing data

Keep a permanent record of calibration data in case the instrument memory gets corrupted for any reason.

**1 Connect output device - ICP100 In-cab printer, PSION etc.**

**2 Enter CAL mode 1** 



**3 Hold.**

*All calibration data is downloaded.*



## Error message


*Flashes for a short period and then defaults to previous function.*

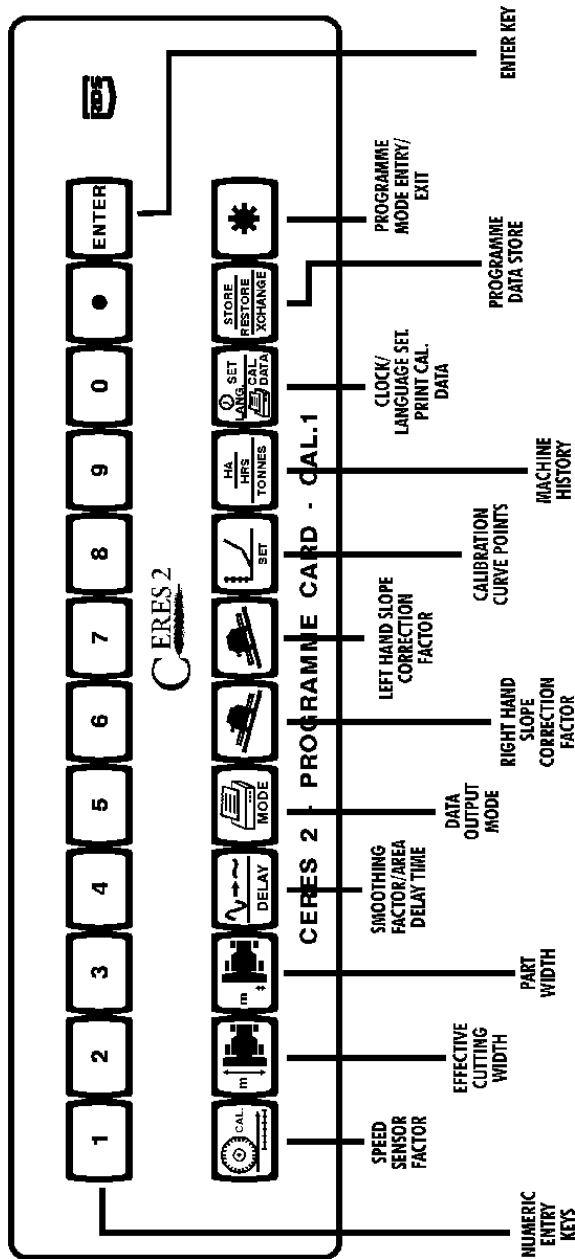
Ceres cannot transmit data because the output device is not responding. Check output device and cable connections.



## Exit CAL mode

---

Either switch off, or hold the button marked  on the overlay card until the display reverts to operating mode.



# CAL mode 1

## Speed sensor factor



The distance the vehicle travels forward over two intervals between speed sensor pulses. Factory default = 2.000 m (78.74 ")

This could be calculated based on nominal tyre diameter or rolling distance and entered manually, however this does not take account of wheel slip, sinkage or tyre deformation under practical operating conditions.

## Auto-Calibration

The best method is to do an 'AUTO CAL' over a measured distance\* as follows;

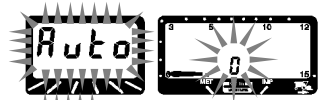
**1 Place two markers in a field (not on a tarmac or concrete driveway) exactly 100 metres apart.**

**2 Position the vehicle with the first marker level with some reference point on the vehicle, e.g. a wheel hub centre.**

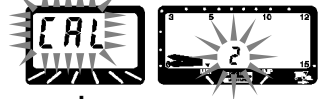


**3 Hold.**

*LH display flashes.*



**4 Drive the test distance.**



**5 Stop when the reference point on the vehicle is exactly opposite the 100 metre marker.**



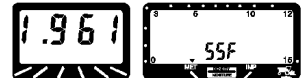
Do not reverse the vehicle if you overrun the 100 metre marker. Repeat from Step 2.

*RH display shows no. of sensor pulses*



**6 Press**

*Displays calculated speed factor.*



\* Measuring the distance is easier with a trundle wheel. Start the AUTOCAL function and move off along the field while an assistant walks alongside the combine with the measuring device, for 100 metres.

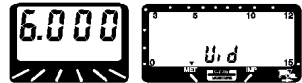
## Effective cutting width



The actual cutting width of the header unit in metres or inches.

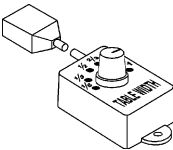
Factory default = 6.000 m

To enter new value. 



Secondary data.

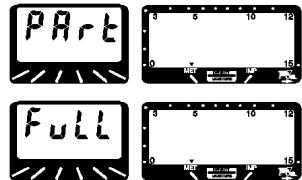
## Part/full width



To change option. 

Setting if table width switch fitted.

Setting if no table width switch fitted.



## Part cutting width

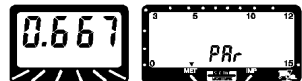
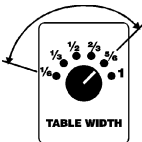


Part widths are factory-set to suit the six position selector switch, and should not need to be reset.

If it is necessary to change values, set the switch at each position in turn, then enter new value.



e.g. displaying decimal equivalent of fractional width ( $\frac{2}{3}$ ).



The operator may prefer to gauge part width based on the number of reel sections in the crop.

e.g. for a 5 section reel,  
switch settings will be 1, 0.8 ( $\frac{4}{5}$ ), 0.6 ( $\frac{3}{5}$ ), 0.4 ( $\frac{2}{5}$ ), 0.2 ( $\frac{1}{5}$ ), 0

for a 4 section reel,  
switch settings will be 1, 0.75 ( $\frac{3}{4}$ ), 0.5 ( $\frac{1}{2}$ ), 0.25 ( $\frac{1}{4}$ ), 0, 0

# CAL mode 1

## Smoothing factor



Averaging time for the grain sensor signal, to allow smooth displays

Maximum smoothing = 10

Secondary data.



## Area Delay

Ceres starts to measure area as soon as the cutter bar is positioned to enter the crop, but grain yield data is delayed by the time taken for the crop to reach the sensor located in the clean grain elevator.

The area data can be delayed by the same time period to give a delayed but true yield/area function. The correct setting is particularly important if yield mapping so as to obtain good maps.

To establish the delay time,

- (i) time the interval between the cutter bar entering the crop, and the TARE LED going OFF.
- (ii) At the end of the field time the interval between the cutter bar leaving the crop, and the TARE LED coming ON.
- (iii) Add the timings and divide by 2 to obtain the delay time.

Factory default = 15 seconds.


To enter new value.



## Data output mode

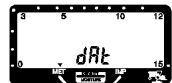
To change option



Setting for field data , printing to an ICP100 printer or transferring farm records



Setting for dynamic data logging enabling transfer of field data in ADIS format to a Hermes data logger.



## Slope correction



Righthand<sup>[2]</sup>



Lefthand<sup>[2]</sup>

Compensates for the re-distribution of grain across the width of the clean grain elevator paddles, when working over cross-slopes, and fitted with a hillside sensor<sup>[1][3]</sup>.

[1] Installed as recommended, with the sensor cover facing towards the rear of the combine.

[2] As viewed from drivers seat.

[3] If no sensor is installed, both factors must = 0

Factory default:

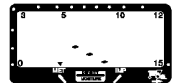
Righthand slope = -0.208 % darkness per degree of slope

Lefthand slope = -0.107 " " "

*Refer to the calibration table for your combine.*



1 Select either function.



2 Enter new value from table.



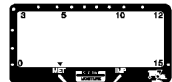
## Secondary data

Check and set values either positive or negative.

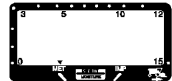
3 To change option.



*Setting for negative factors.*



*Setting for positive factors.*



# CAL mode 1

## Calibration curve points



Enable display of accurate grain yield values based on the signals received from zero(tare) to maximum throughput of the elevator.

Correction values are programmed for each of six calibration points  
Factory defaults (% darkness) are :

PC5 = 30.12      PC4 = 23.76    PC3 = 17.29

PC2 = 10.10                      PC1 = 5.79      PCt = 0.0

PCt is the tare value found on the test combine. The tare reading on another example of the same model will probably have a different value. When a subsequent tare procedure is done, (ref. Operating instructions), all PC values will be offset by the difference between that tare reading and PCt.

*Refer to the calibration table for your combine.*



### 1 Press

*RH display indicates curve point #.*



### 2 Enter new value from table.

### 3 Repeat from step 1 for remaining points.

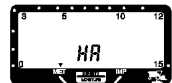
## Machine history



### Press to cycle through totals.

*All totals are zeroed when instrument is totally reset.*

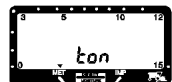
*Total area*



*Total hours*




*Total weight harvested*



## Time/date/language



Sets 24 hr time, day (Monday = day 1), month, and english, french or german display. Imperial units are disabled when french or german language is selected.

Also enables printout of all calibration data.  6

### Set time and date




1 Press.


2 Enter hours/minutes.  4

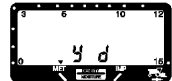


3 Enter date/month\*.  4



\* or month/date if instrument set in 'Bushel mode'.  16

4 Enter year/day of the week.  4



### Set language



5 Select option.

*English*



*French*



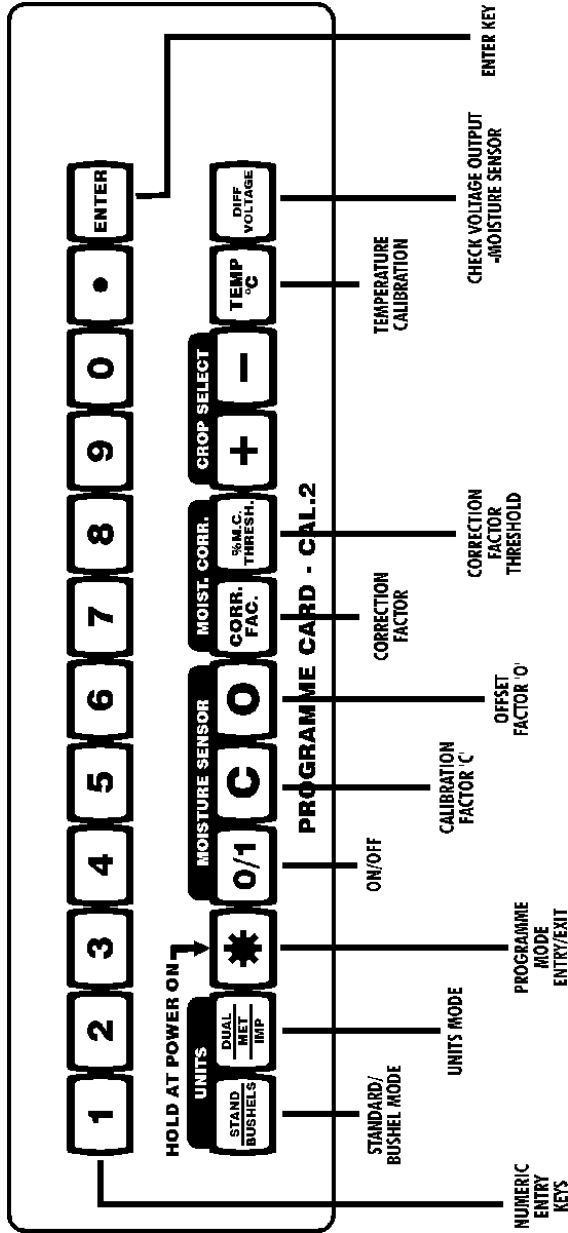
*German*



5 Press to accept.

All display prompts and printed data will now be in the chosen language.

# CAL mode 2



When a moisture sensor is installed, it must be programmed\* 'ON'.

\* Can be switched on/off in operating mode.



- 1 Press.
- 2 Press again to switch on or off.

## Moisture sensor calibration factors

Two programmable factors 'C' and 'O' for each crop reference need to be programmed only once<sup>[5]</sup> on installation, unlike moisture correction offsets which are adjusted during the daily operating routine.

The following 'C' and 'O' values<sup>[4]</sup> have been determined for individual crop types, by a series of calibration tests,

Crop reference	Factor 'C'	Factor 'O'
A Wheat	7.037	4.100
B Barley	3.747	1.020
C Oats	5.520	8.400
D Oilseed rape	2.117	1.000
E Linseed	4.000	5.000
F Beans	4.013	7.100
G Peas	4.000	5.000
H Maize	7.907	2.000
J User-defined	7.037 <sup>[4]</sup>	2.000 <sup>[4]</sup>

<sup>[4]</sup> Factory defaults.

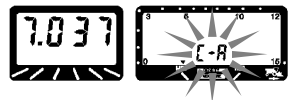
<sup>[5]</sup> Unless very large correction offsets become necessary during daily operation.

## Factor 'C'



- 1 Press

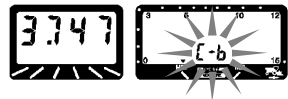
RH display indicates factor and crop ref.



- 2 Enter new value if required.



- 3 Select crop.



- 4 Repeat step 2.

4

# CAL mode 2

---

## Factor 'O'



The calibration procedure is identical to that for factor 'C'



## Moisture correction factors

---



Not to be confused with the crop specific, correction offsets described as part of the daily operating routine.

This enables accurate yield readings to be displayed above the normal moisture range i.e. in exceptionally wet crop conditions.

Factors 'C' and 'O' are satisfactory within a certain percentage range of harvest % M.C. The correction factor takes effect above a user-programmed % M.C. threshold value.

Factory default = 0 % darkness per %M.C. above threshold value.

To enter new value for either.



## Bushel mode

---

Allows U.S. bushel weight to display instead of tons when Imperial units are selected in operating mode. The date/month display is also reversed.



1 Press.

2 Press again to select option.



Tons

U.S. bushels

## Units mode

---

Select units *available* in operating mode.

1 Press.

2 Press again to select option.



Both



Metric only



Imperial only

## Temperature Sensor

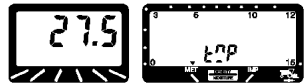
The moisture sensor also senses grain temperature in order to maintain a correct moisture measurement. This feature is **operable with** Ceres units built after 03/01/96 , Serial no. 74037 onwards and with Software Version NG 406-538, or with a **blue** sticker on the rear of the case.

Older units connected to a moisture sensor or fitted with upgraded software, or with a **red** sticker, **must not be programmed** as described. To do so will adversely affect moisture readings, necessitating a 'power-on reset' and re-programming all data.



### 1 Press

*LH display indicates temp °C  
in grain tank auger.*



This may be significantly more than ambient temperature when the machine is in direct sunlight.

### 2 Measure temperature, and enter value.

or for older units



### 1 Hold to select 'ON/OFF' option.

### 2 Select 'OFF' and press ENTER.

## Power-on reset

---

### ALL STORED CALIBRATION AND FIELD DATA WILL BE LOST!

It is recommended to print out calibration data whenever it is altered and download field data regularly. This will minimise loss of data should for any reason the instrument memory get corrupted

Press and hold both the bottom lefthand and righthand switches, then switching the power on. The instrument will self-test and restore all factory default settings. The display also indicates the installed software version.

### Note for yieldmapping:

The instrument resets to Job 1. To avoid duplicate job numbers which may cause confusion with existing archived data, run 'dummy' jobs by starting and ending data logging until the job number follows on from the last job undertaken.

# Calibration record

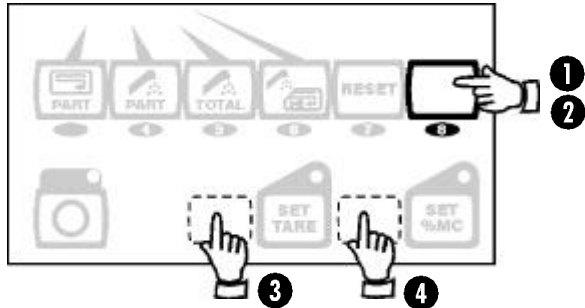
It is recommended to keep a written record of all calibration data using the chart below. Alternatively, obtain a printout.



Ref.	Crop	Variety	Cal.factor					Storage M.C. %
A	Wheat							
B	Barley							
C	Oats							
D	Oilseed rape							
E	Linseed							
F	Beans							
G	Peas							
H	Maize							
J								
<b>Speed Sensor Factor</b>								
<b>Cutting Width</b>								
<b>Area Delay Time</b>								
<b>PC. Factors</b>		PC †	PC 1	PC 2	PC 3	PC 4	PC 5	
<b>LH Slope Correction</b>								
<b>RH Slope Correction</b>								

# Diagnostic functions

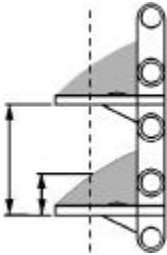
In Operating mode



In Cal. mode 2



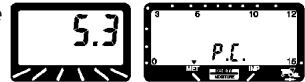
## 1 Check % Darkness



Press and hold for approx. 6 seconds.



LH display indicates % darkness measured by grain sensor. (Normal tare value close to Pct figure in Cal. chart when running elevator empty)



### Condition

Zero reading during tare.  
(TARE LED flashing)

### Possible cause

Grain sensor transmitter not connected.

Grain sensor receiver faulty.

Grain sensor receiver not connected.




### Check

LED on sensor should be permanently on, otherwise check connections.

LED on sensor should flash when light beam is interrupted. otherwise check signal voltage (0 - 10 V). at Weatherpak connection from sensor.

Check signal voltage at Harting.

# Diagnostic functions

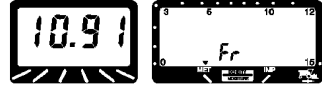
Condition	Possible cause	Check
Significantly lower than PCt figure in Calibration chart.	<p>Incorrectly programmed.</p> <p>Dirty/scratched sensor lenses</p> <p>Reduced paddle thickness.</p> <p>Sensor 'X' position incorrect.</p> <p>Hillside sensor set to zero while on slope, reducing or increasing PC figures.</p>	<p>Check in Cal. mode 1</p> <p>Open sensor bracket. Inspect and clean or replace.</p> <p>Inspect through sensor hole.</p>
		 
Gradually diminishing or increasing from PCt figure in Calibration chart.	<p>Worn paddles or slack elevator chain allow chain assembly to move in 'X' axis relative to sensor, under load.</p> <p>Build-up of residue or rubbish on paddles.</p>	<p>Shut down combine mechanism while at full throughput.</p> <p>Open sensor bracket and inspect through sensor hole.</p> <p>Adjust chain tension.</p>
Fluctuates.	<p>Sensor beam too close to paddle support brackets or holes in brackets.</p> <p>Smoothing factor too low.</p>	<p>Inspect through sensor hole.</p>
		


## 2 Check paddle frequency

Press and hold for approx. 12 seconds.



LH display indicates paddle frequency per second .  
(Normal fluctuation  $\pm 0.99$ ).



Condition	Possible cause	Check
Increases at full throughput.	Sensor counting falling grains.	Wear on elevator paddles and chain. Check sensor position.
High.	Sensor 'X' position incorrect. Sensor counting holes in paddle support brackets.  Smoothing factor too low.	Check sensor position.  
Excessive fluctuation.	Grain sensor detecting holes or other features in paddle support bracket due to slack chain.  Grain sensor detecting gaps between paddle support bracket and paddle rubbers.	Refer to manufacturers maintenance instructions.  Check condition of rubber pads. Refer to manufacturers maintenance instructions.

# Diagnostic functions

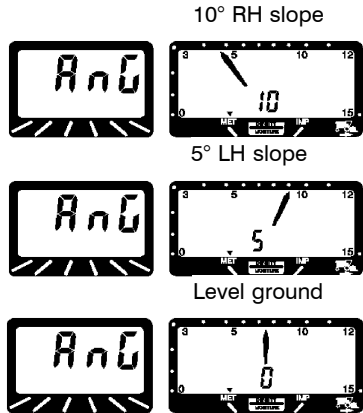
## 3 Hillside Sensor

Press and hold for 12 seconds.

RH display should indicate direction of slope and angle in degrees.

With the combine on LEVEL ground, the display should read zero with the pointer vertical. If this is not the case then,

Zero by pressing the ENTER switch for 5 seconds.



## 4 Checking Moisture, Angle and Temperature sensor outputs

Press and hold for 12 seconds.

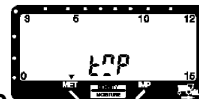
LH display should indicate an output voltage (1 - 6V) from angle sensor (3V when level).

Press again.

LH display should indicate an output voltage (1 - 6V) from moisture sensor interface board.

Press again.

LH display should indicate an output voltage from temperature sensor.



## Checking Moisture sensor differential voltage

## 5 ss once.

LH display should indicate the difference in voltage between +V and -V of the moisture sensor.



## Update information

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### Iss. 09e 20/07/96 Ref: NG 406-538

Temperature sensor calibration. added	p.4	Under heading 'Cal Mode 2' ,
: Ref. Service bulletins dated 04/07/96		added 'Temperature'.
and 17/07/96 - PGN	p.15	Updated Cal 2 Card:
	p.17	Under heading 'Bushel Mode' and 'Units
		Mode' , deleted reference to 'unmarked
		switch'.
	p.18	Temperature sensor calibration routine.
Diagnostic functions added.	p.30 - 32	
Power-on reset instruction added.	p.18	
Expanded instructions to set delay	p.11	
time.		

### Iss. 10 01/03/97 Ref: NG 406-542

'no-op' error message.	p.6	Changed text.
Using trundle wheel for autocal	p.8	Added text.
routine.		
Smoothing factor no longer program-	p.10	Changed text.
mable.		
Time/date reversal in bushel mode.	p.13, p.16	Added text.
Programming temp. sensor off.	p.17	Added text.
Avoiding duplicate job numbers after	p.17	Added text.
power-on reset.		
Crop record chart.	p.18	New chart for varieties.
Calibration data.	p.27	FIAT-LAVERDA 517 INTEGRALE
Diagnostic information	p.31	Added text -
		ref. paddle frequency fluctuation.

### Iss. 11 6/8/97 NG406-543

Smoothing factor programmable	p.10
Moisture sensor on/off in op mode.	p.15

## Update information

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CLAAS LEXION cal figures added p.20 (replaces addendum \ADDM-2.DTP)  
All NH cal figures revert to old set p.25 (replaces addendum \ADDM-1B.DTP)

Issue 12 : 4/6/99

Cal data removed  
(now in ADDENDUM 1: - UK183-7.DOC)

Your local distributor is: