

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

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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

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\\UK069-6.DTP

User Guide.

Ceres 2

Operation

Software Ref: 406-543

Contents

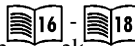
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The RDS *Ceres 2* is a continuous grain yield measurement system suitable for virtually any combine harvester. The system comprises of a number of permanent sensors to measure grain yield, forward speed, moisture content (optional), cross-slope and header position.

The head unit can be easily transferred between different machines. The front panel LCD displays and buttons are positioned in colour-coded groups for easy operation. The unit includes an internal alarm and automatically secures data in memory if powered off (even when totally disconnected from the vehicle). It is normally powered on via the vehicle ignition circuit and recalls the function selected when last used.

Features

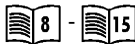
Display functions (blue)



Information can be displayed in metric or imperial units (including US Bushel weight) including;

- Wet yield rate/Average wet yield rate per unit area.
- Wet yield rate/Average wet yield rate per hour.
- Average dry yield rate per unit area.
- Work rate/Average work rate - area per hour.
- Part/total area.
- Part/total wet yield weight.
- Part/total dry yield weight.
- Forward speed.
- Time and date.

Settings (maroon)



Many settings are programmed only once during installation (see Calibration Instructions). Others are dependent on crop conditions. As conditions vary constantly, regular checks and adjustment as part of the operating routine, help to maintain maximum system accuracy.

Settings for each of up to nine different crops in the crop directory include,

- Harvest moisture content (automatic with optional continuous moisture sensor).
- Storage moisture content.
- Harvest density.

A selector switch compensates when cutting less than full width.

Data logging (yellow) 19 - 23

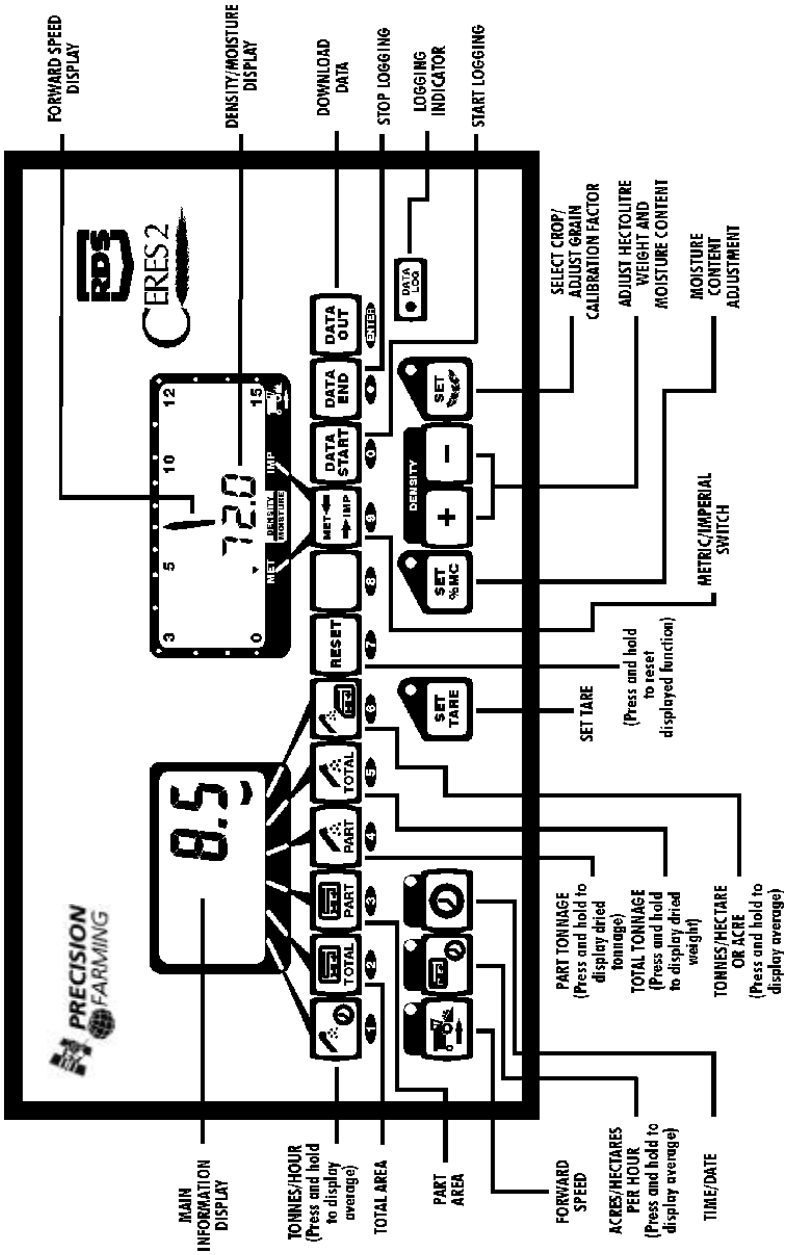
Up to 275 individual field/plot records can be stored in memory. Each can also include extra user-programmed information. Records can be printed from an RDS *ICP100* In-Cab Printer or transferred directly/indirectly to a standard PC for crop management use.



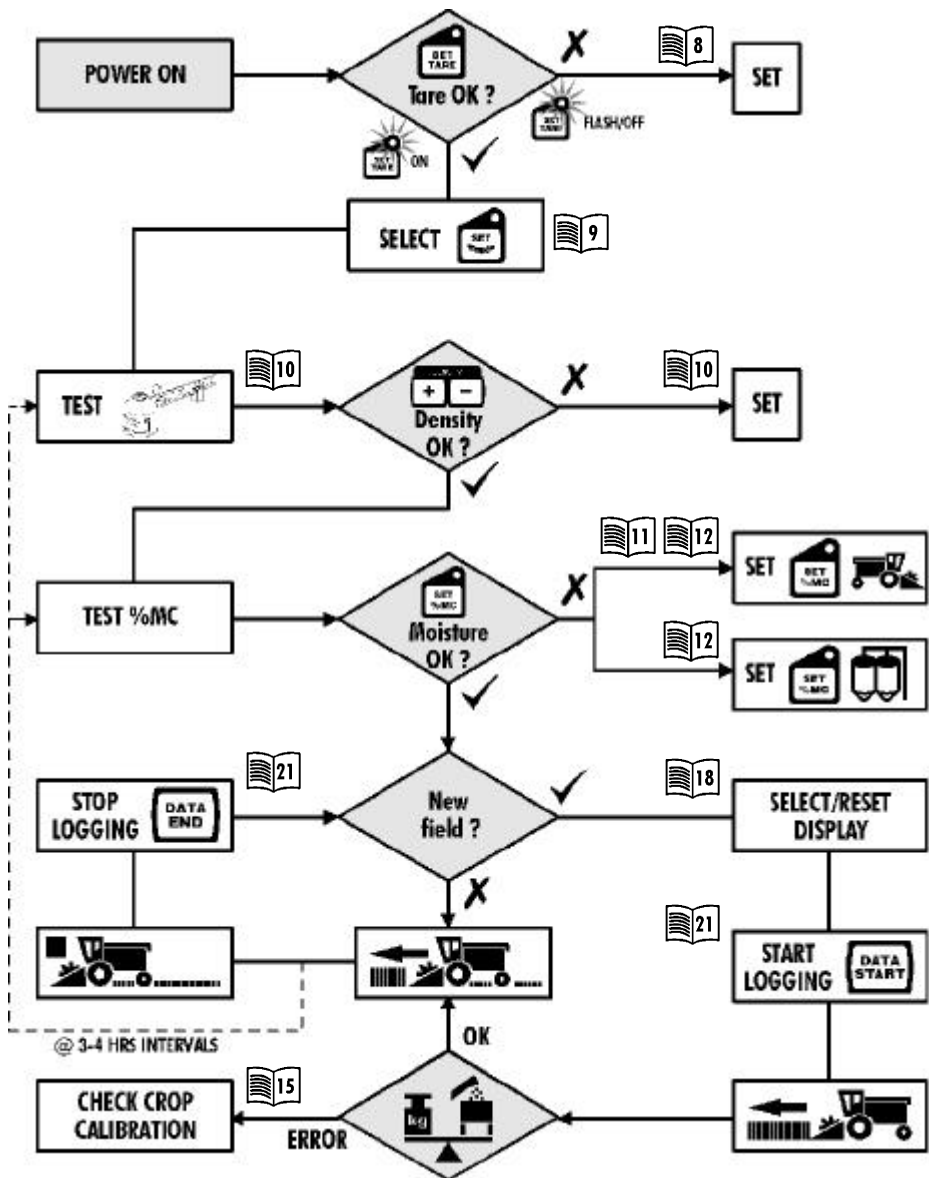
It is recommended to download field data on a regular basis, to minimise the risk of data loss in Ceres memory for whatever reason.

Ceres can also continuously transfer information to a *Hermes* data logger. When combined with position information from the RDS *Jupiter* GPS receiver, and using computer software, yield maps can be produced - a key step in 'precision farming'.

Front panel

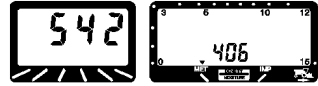


Daily operating routine



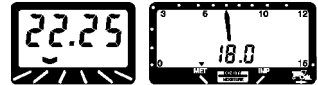
1 Switch on (normally via the ignition circuit)

Displays self test routine and installed software reference.



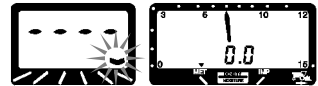
2 Wait for the display to settle.

Displays the previous function, e.g.



NOTE

Normal grain yield and % moisture content readings (with optional sensor) are dependent on a preset delay time (for grain yield function), and grain flowing into the tank.



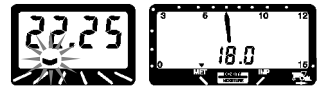
*No grain in elevator
(with optional moisture sensor on)*

Work/function indicator



Indicates the function selected.

Area stops accumulating and chevron flashes when the header is lifted, e.g. when turning on headlands

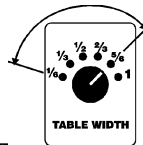
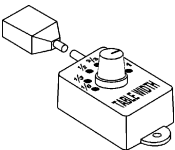


Out of work

Set cutting width

Select to suit crop width.

Alternating display until full width set.



Select.

All displayed/programmed data is converted.



The availability of both Imperial and Metric units is the UNITS MODE setting (ref. CAL mode 2).

Imperial units can be set as tons or US bushels (CAL Mode 2), but are unavailable if foreign language display is selected (CAL Mode 1)



Tare

Check tare

Normal wear and/or buildup of crop residues in the clean grain elevator will adversely affect the grain sensor signals.

- A** Position machine on level ground.
- B** Run combine at normal operating speed.
- C** Ensure the clean grain elevator is empty.



L.E.D. off - Check **C** otherwise set tare.
L.E.D. on continuously - Tare OK.
L.E.D. flashes - Check **B** otherwise set tare.

Set tare

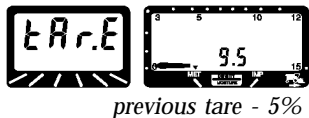
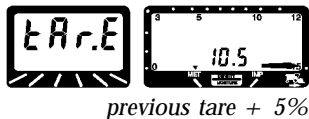
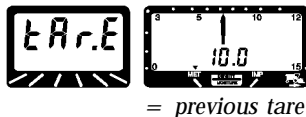


1 Check **A B C**

2 Hold

The RH digital display shows grain sensor signal (% dark).

The RH 'needle' display shows the difference from previous tare in the range $\pm 5\%$.



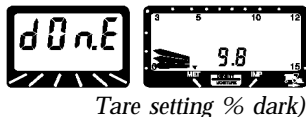
NOTE

Press any other button to cancel procedure.



3 Press when display is steady.

Displays tare value for 5 seconds then defaults to previous display.





Ceres can be programmed for up to nine different crops, designated as follows;

- | | |
|-----------------------|-------------------------|
| A Wheat | F Beans |
| B Barley | G Peas |
| C Oats | H Maize |
| D Oilseed Rape | J (User Defined) |
| E Linseed | |

Programmable data for each crop are;

- ▣ Harvest density (hectolitre or bushel weight)
- ▣ Moisture sensor correction factor (with optional sensor)
- ▣ Storage moisture content
- ▣ Grain calibration factor

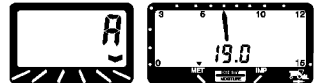
NOTE

Crop selection and grain calibration factor **cannot** be altered when logging data.

Select crop

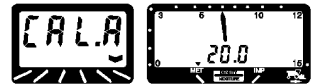


1 **Hold continuously.**

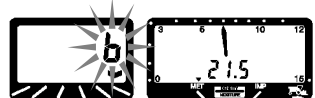


NOTE

If held for too long, then display shows 'CAL'. Release and start again.



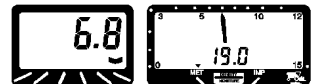
2 **Select crop.**



3 **Release all.**

Grain calibration factor

Displays then default to the previous function.



(% moisture) for selected crop

Harvest density

Ceres measures grain **volume**, and converts to harvest weight based on a manually set harvest density.



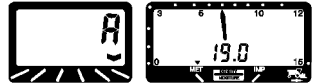
Measure the reference density using the Grain Volume Weigher supplied, and adjust the programmed value to match.

- 1 **Fill the measuring cup right up to the top.**
- 2 **Sharply tap the side of the container once to settle the grain. Refill the container to the top.**
- 3 **Suspend the unit from the ring**
- 4 **Slide the counterbalance weight along the balance arm until the level bubble on the weight is centred.**
- 5 **Read off the grain density from the scale on the balance arm, immediately above the mark in the centre of the counterbalance weight.**

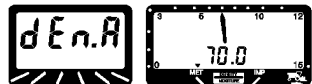
NOTE

The measuring scales are in kilograms/hectolitre and pounds/US bushel. If necessary, use the conversion given on the side of the measuring cup to convert from kg/hl to lbs/UK bushel.

- 1 **Select crop.** 



- 2 **Select.**



- 3 **Adjust to match measured density (0 -100 kg/hl in ± 0.5 increments).**



*LH display continues for 10 seconds the defaults to previous function.
Red display shows density unless % M.C. is selected.*



Density for selected crop

NOTE

Resetting density does not correct previously accumulated data.

Moisture content



Ceres can permanently display harvest % moisture content, either based on a manually set value, or automatic input if a continuous moisture sensor is fitted and switched on.

A manually set storage moisture content (specific to each crop setting) enables dried weight to be displayed.

Display moisture content (with continuous sensor)



LH display continues for 10 seconds then defaults to previous function.
RH display shows 'live' % M.C. unless density is then selected.



NOTE

A display indicating that no grain is passing the sensor.



Moisture content correction (with continuous sensor)

The moisture readings from the sensor may need fine adjustment to match those from a reference moisture meter. The correction factor or 'offset' is programmed specific to each crop reference.

1 Select crop.



2 Hold continuously.



LH display cycles through -

e.g. 'PC A' - 'AV' - 'sens' - 'dry.A' - 'pc



3 Adjust offset (±0.5 increments).

% M.C. offset



e.g. if true moisture content = 16%
and Ceres averaged reading = 18%
then offset = 16 - 18% = -2 %



Displays then default to previous function.

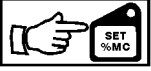
If a large offset is necessary, this suggests that the sensor needs to be re-calibrated (CAL mode 2).

NOTE



Moisture content

Display average* moisture content (with continuous sensor)



Hold.

LH display first shows 'PC A'.



average % M.C.

(* since part counts were last reset.)

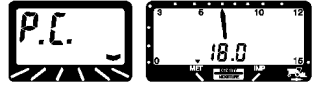
Display and adjust moisture content (manual input)



LH display continues for 2 seconds then defaults to previous function.

RH display shows % M.C.

unless density is then selected.



2 Hold.



3 Adjust to match measured % M.C. (5 - 50% in ± 0.5 increments).



NOTE

Resetting moisture content does not correct previously accumulated data.

Display and adjust storage moisture content

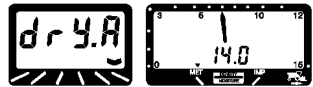
1 Select crop.



2 Hold.



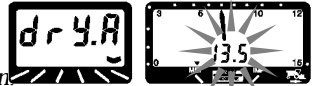
LH display first cycles 'PC'; (no sensor fitted, or if fitted but off) or cycles 'PC A', 'AV', 'sens' (sensor fitted and switched on)



storage % M.C.



3 Adjust to desired value (± 0.5 increments). then release all.



Displays then default to previous function.

Harvest weight = dried weight if average harvest moisture content drops lower than the programmed storage moisture content.

NOTE

Moisture sensor ON/OFF

The optional moisture sensor can be switched on or off in the operating mode (as well as in CAL mode 2).



Hold


The LH display cycles to 'sens'.



Press either '-' to switch off, or '+' to switch on.

Initial values

The Grain calibration factors are factory-set to 20.0. Initial calibration for each crop is done on installation.

Refer to the calibration table for your combine in the Calibration Instructions (from  19)

To programme Grain Calibration.  15

The repeatability of these recommended values has been checked on a number of examples of each combine model. Due to natural variations within particular crops and between varieties, some minor adjustment of the Grain calibration factor is often required.

When to adjust

If Ceres gives **consistent** discrepancies between its weight readings and weighbridge readings, then the grain calibration factor can be adjusted independently for each variety in the crop directory.

NOTE

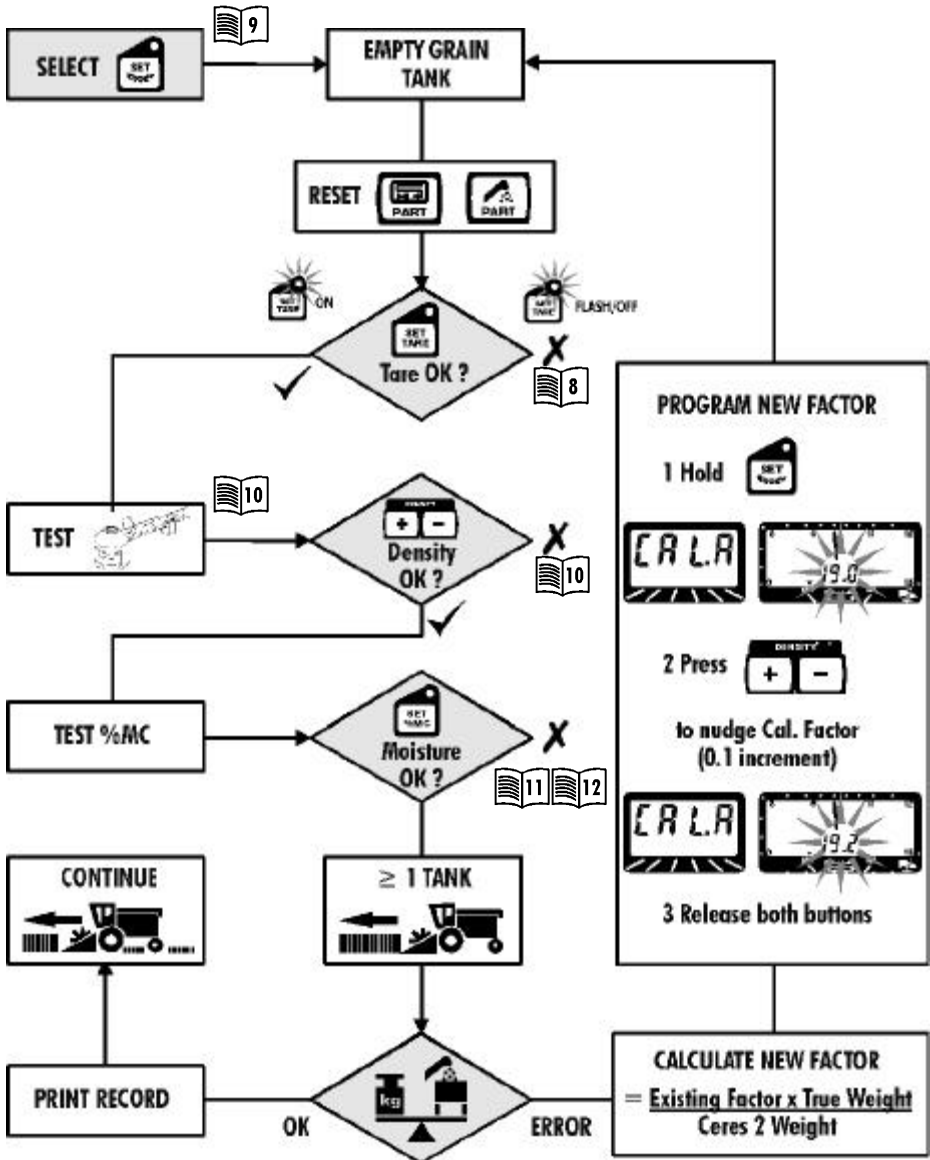
Tare, grain density and moisture content are directly related to grain yield measurement. These are more likely to be responsible for discrepancies and should be checked first.

All previously accumulated data will be corrected for a new grain calibration factor entered. The procedure may be repeated if subsequent errors occur. Before adjusting, note the existing factor either by obtaining a printout or in the space below.

Grain calibration factor

Ref.	Crop	Variety	Grain calibration factor currently set		
A	Wheat				
B	Barley				
C	Oats				
D	Oilseed rape				
E	Linseed				
F	Beans				
G	Peas				
H	Maize				
J					

Crop calibration routine











Crop selection and grain calibration factor **cannot** be altered when logging data. If logging, it is recommended to change settings once the field is completed.

Display functions

The blue buttons control the display and resetting of work functions. Functions are indicated either by the chevron on the blue display or an LED next to a button.

Units

Work function	Metric	U.K. Imperial	U.S.
 Yield/hr	tonnes/hr	tons/hr	bushels/hr
  Area	hectares	acres	acres
  Weight	tonnes	tons	bushels
 Yield/area	tonnes/ha	tons/acre	bushels/acre
 Work rate	hectare/hr	acres/hr	acres/hr
 Speed	km/hr	miles/hr	miles/hr

NOTE

Bushel weight is selected from CAL mode 2.

Averages

The total averaging period is based on the cumulative time that the clean grain elevator is running since the part counts were last reset.

Hold the appropriate button.

The blue display defaults to the instantaneous rate after 3 seconds.



Reset



- 1 Select the appropriate function.
- 2 Hold.



Time/date



Time displays in 24 hr format followed by the date and month, then defaults to previous function.*



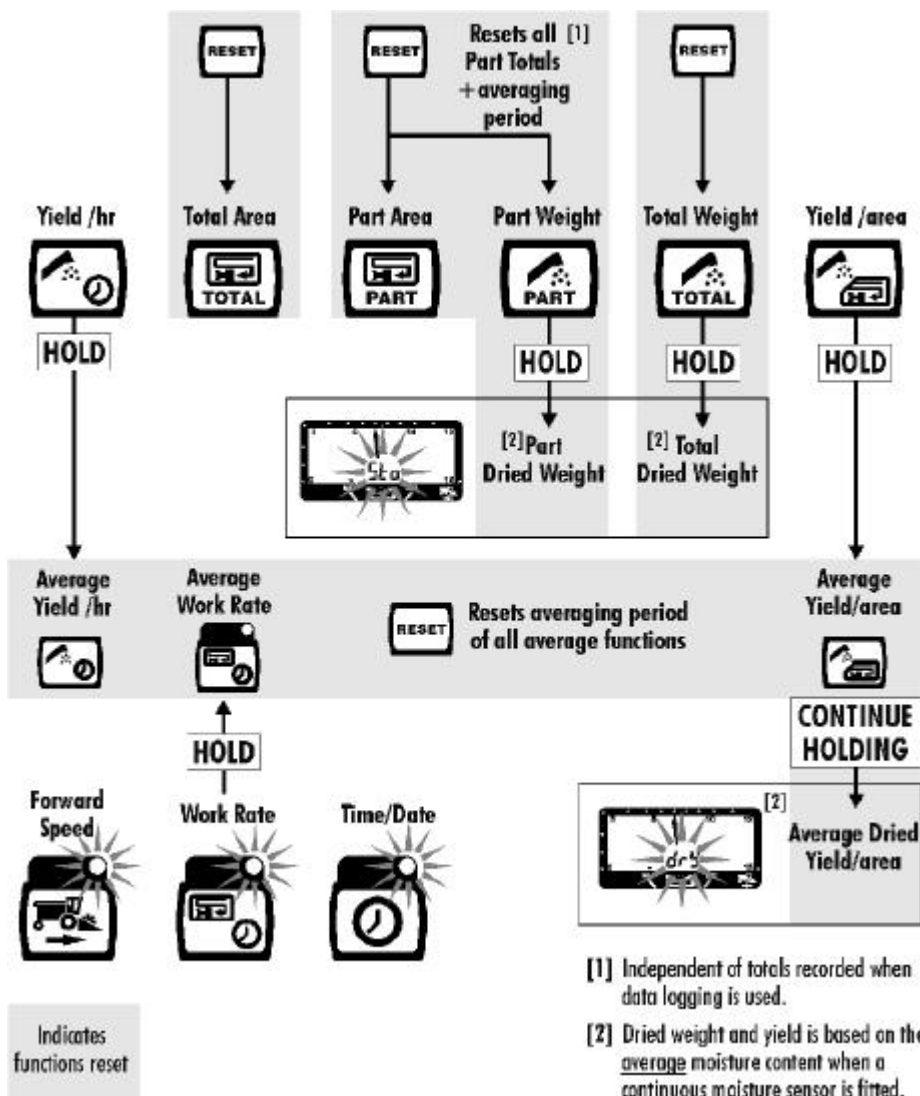
time



day/month

*If 'Bushel mode' is selected (Calibration book - ) , then the day/month display is reversed.

Display/reset functions






The yellow buttons control data logging and transfer.

indicates when data logging/transfer is in progress.

Crop selection and grain calibration factor cannot be changed while logging data.

Select logging mode

Selected from CAL mode 1 (ref. calibration Instructions  10).

Field data logging is for straightforward job printouts/farm records/crop management software etc.

Dynamic data logging enables data output in a standard format (ADIS) suitable for use with yield mapping software.

Field data

Both field and dynamic logging includes the following **basic** data;

Job number (sequentially assigned by *Ceres*)

Job date

Start time

Job duration (start time to end time)

Crop reference (A to J) and grain calibration factor

Area (independent of part and total area functions)

Average work rate (area per hr of elevator running time)

Harvest weight

Dried weight (at average % M.C. with continuous sensor)

Average harvest yield/area

Average dried yield/area

Average yield/hr (weight per hr of elevator running time)

Average harvest moisture content (with continuous sensor)

Storage moisture content

Average density

Field data logging enables from 83 to 275 individual jobs to be stored in memory. Selected jobs can subsequently be printed or otherwise transferred at any time via a standard RS 232 connection.

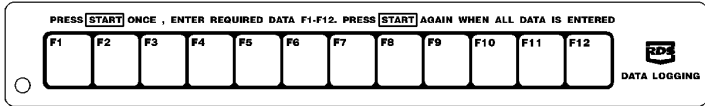
It is recommended to download field data on a regular basis, to minimise the risk of data loss in Ceres memory for whatever reason.



Data logging

Extended data

Both field and dynamic logging can include up to 12 supplementary data items, each being a number from 1 to 9999. These functions are identified as F1 to F12 on an overlay card provided.



The meaning of each function is determined by the farmer, or in conjunction with the supplier of farm management software, and can be noted on the overlay card. They may refer to information such as,

- Field name
- Customer reference
- Crop variety
- Chemicals applied etc.

You can input extended data using the top row of buttons whenever data logging is started, or easily bypass this option.

Programming a field number

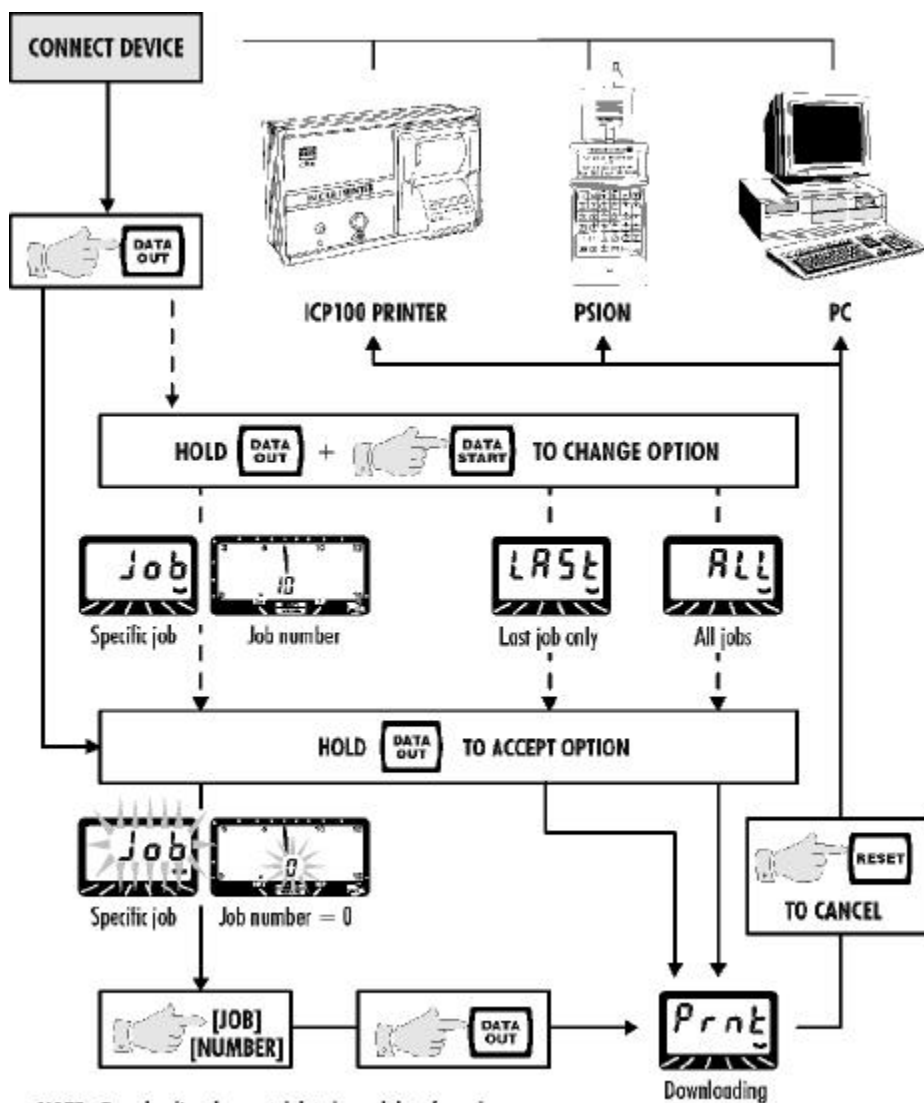
Unlike in field logging mode, F12 is *pre-defined* in dynamic logging mode as the field number. If F12 is programmed, then Hermes opens a dynamic logging file on a floppy disk as DLJJJFFF.001 where JJJ is the job number and FFF is the field number programmed.


Dynamic data

Dynamic data logging generates a 'data string' enabling the basic data to be transmitted in ADIS format to a *Hermes* data logger continuously as harvesting progresses.

For further information refer to the *Hermes/Jupiter* instruction manual.

Download field data



Ceres must be set up in CAL mode 1 for dynamic logging (ref. Calibration instruction manual  10).

The procedure is identical to that for logging field data (including extended data input, except the display sequence is interdependent with *Hermes* operation).

Error message





















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




If this occurs constantly when attempting logging or downloading field data, then the data link is probably faulty.

Check the attached device is switched on, all connections are made and re-check the procedure for data downloading or dynamic logging (see separate instruction card provided with yield mapping installations).

Troubleshooting guide

Condition	Possible cause	Check
Ceres weight output does not read same as weighbridge.	Wrong crop code set.	Op.  9
	Cal. factor incorrect.	Op.  15
	Tare incorrect.	Op.  8
	Wrong grain density setting	Op.  10
	Wrong moisture setting.	Op.  11  12
Weight/area display reads zero.	Speed sensor not working.	} Ref. Inst. book
	Area cutout switch not working or set incorrectly.	
	Grain sensor not working.	
	Cutting width switch not connected/setup.	
Part weight, Total weight, or Weight/hr display reads zero.	Grain sensor not working.	Cal.  29  1
	Area cutout switch not working or set incorrectly.	Ref. Inst. book
Chevron on LH display keeps flashing.	Area cutout switch not working or set incorrectly.	Ref. Inst. book
	Cutting width switch not connected/setup.	Cal.  9
Storage weight values are very high/low.	Storage moisture content setting incorrect.	Op.  12
	Moisture sensor fault.	Cal.  32  4  5
Moisture sensor fitted, but reads zero while combining.	Area cutout switch not working or set incorrectly. (Moisture reads zero if header is up).	Inst.  9
	Moisture sensor fault.	Cal.  32  4  5
Yield display erratic.	Hillside sensor fault.	Cal.  32  3  4

Troubleshooting guide

Condition	Possible cause	Check
Yield display erratic (<i>cont</i>)	Slack elevator chain.	Check and adjust as per manufacturers recommendations.
Moisture reading remains outside normally expected range.	Crop residue buildup on moisture sensor.	Remove from auger tube and clean - more often with oily crops.
<i>Ceres</i> and <i>Hermes</i> do not communicate.	<i>Ceres</i> not set to DYNAMIC mode. <i>Hermes</i> not set to DYNAMIC mode. Wiring not connected properly. Blown fuse(s).	
Gaps occur on alternate ends of the yield map.	Area delay factor set incorrectly.	Cal. 



Update information

Iss. 04c 20/07/96 NG406-538

Troubleshooting guide added.

p.24 - 25

Qualifying note for crop selection and calibration.

p.10 - Added paragraph - 'Crop selection and grain calibration factor **cannot** be altered when logging data.'

p.19 - ditto as above.

p.15 - ditto - 'Crop selection and grain calibration factor **cannot** be altered when logging data. If logging, it is recommended to change settings once the field is completed.'

Expanded explanation for 'no op' error message.

p.23 Under heading 'Error message'.

Note: S/W update incurs no changes to operating instructions .

Iss. 5 01/03/97 NG406-542

Crop calibration figures - new chart for crop variety.

p.14

Add. note. Month/day display is reversed when 'Bushel Mode' is selected.

p.18

'no-op' message disabled during dynamic logging (i.e. when *Hermes* is writing to disk)

p.24

Iss. 6 8/8/97 NG406-543

Density range now 0-100

p.10

Moisture sensor on/off option now in operating mode.

p.11, p.12, p.13

Section [#] - [Title]

Your local distributor is: