

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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Document number

S/DC/500-10-068 : Issue 7 : 10/5/99

\\UK068-7.DTP

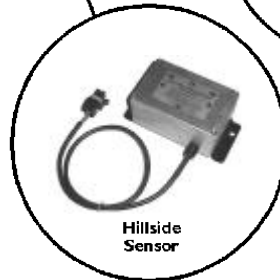
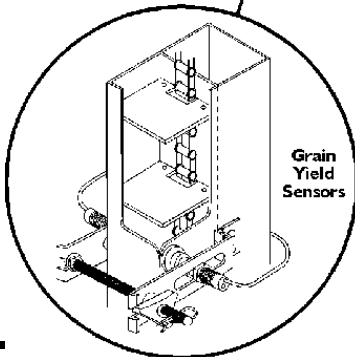
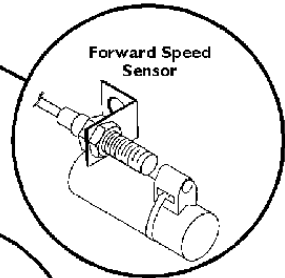
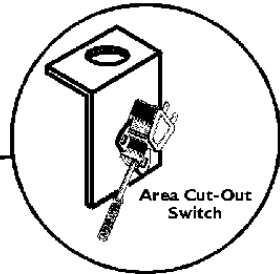
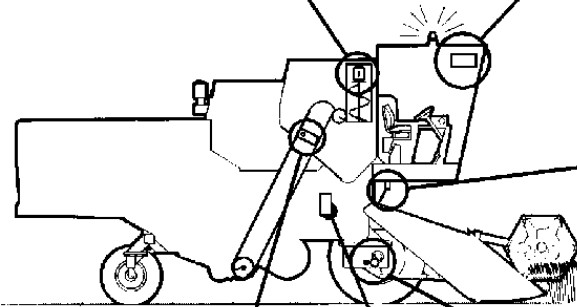
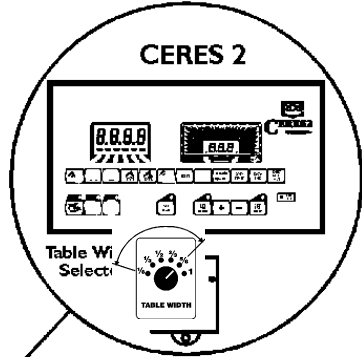
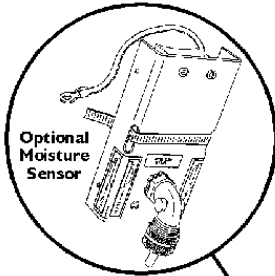
User Guide.

Ceres 2

Installation

Software Ref: 406-543

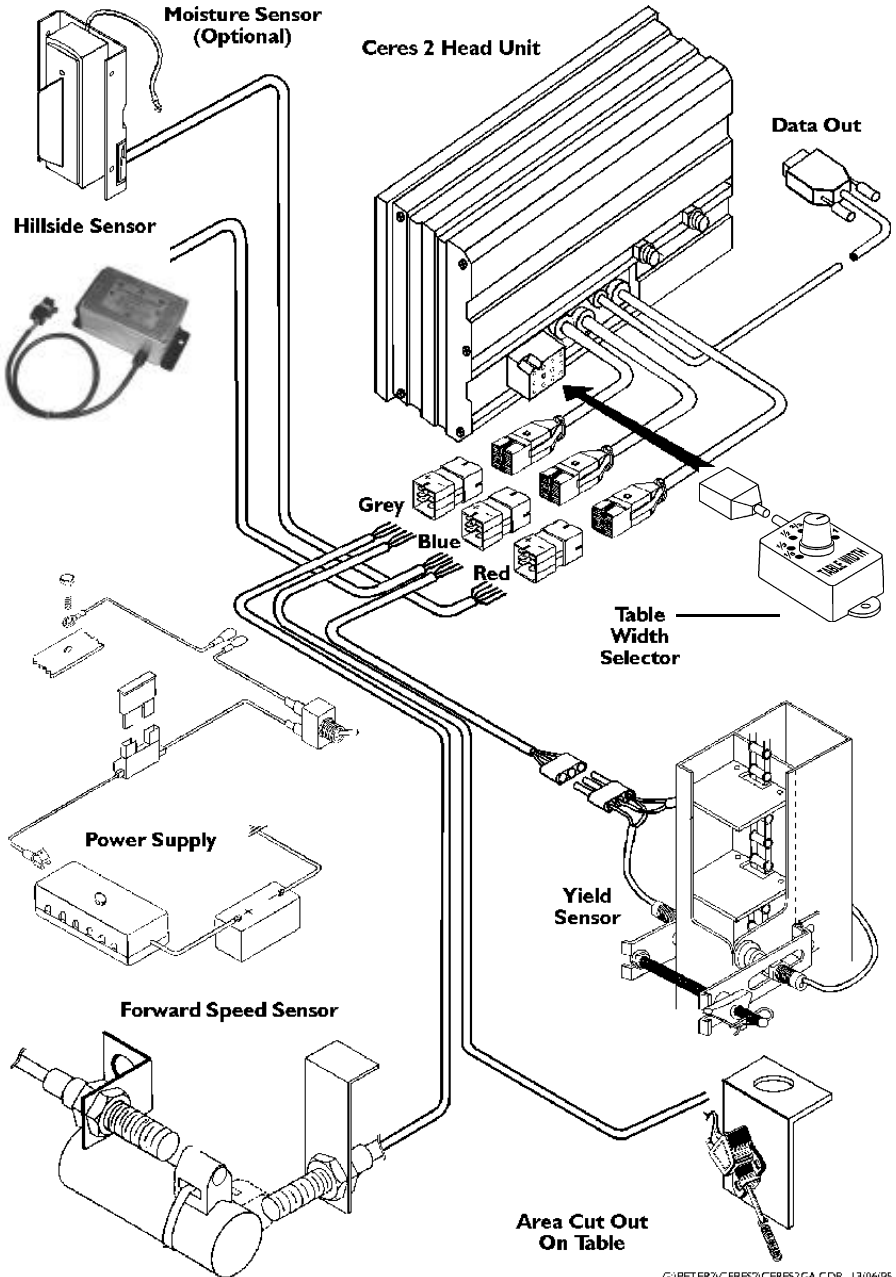
RDS CERES 2 - HOW IT WORKS



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1 - Introduction



1 - Introduction

The RDS *Ceres 2* system is a dynamic grain yield measurement system which can be installed onto any combine harvester.

The *Ceres 2* instrument measures and displays :

- e Forward Speed
- e Area harvested
- e Weight of grain harvested
- e Grain Yield

The *Ceres 2* system comprises :

- e *Ceres 2* instrument in the combine cab.
- e Power supply from the vehicle electrical system
- e Forward Speed Sensor on the combine transmission.
- e Area Override Switch on the combine header.
- e Grain Yield Sensor on the clean grain elevator
- e Cutting Width Selector.
- e Hillside Angle Sensor.
- e Grain Volume Weigher.
- e Printer/Computer Interface.
- e Optional Moisture Sensor.

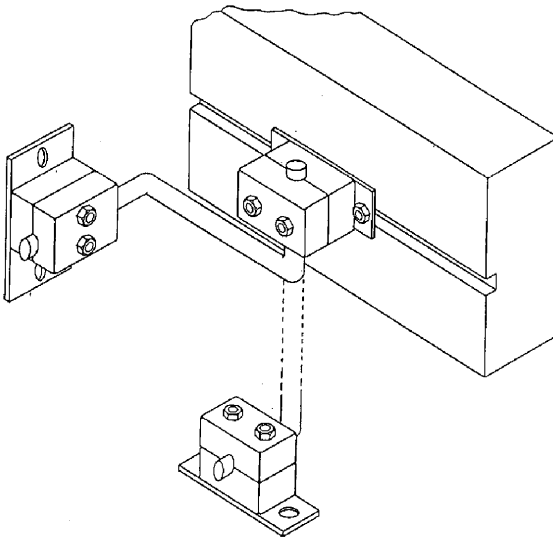
The optional Moisture Sensor may be retrofitted at a later stage, to *Ceres 2* systems manufactured from 1995 onwards. The *Ceres 2* head unit also requires software version NG406-526 onwards, for full compatibility with this optional sensor.

Installation instructions are supplied separately for the Moisture Sensor.

2 - Instrument Unit

The *Ceres 2* instrument has two fixing studs in the rear of the instrument case.

A pair of mounting clamps are provided in the mounting kit. One of these clamps mounts on the fixing studs on the rear of the instrument case. This clamp can be slid along the instrument case as convenient. The second clamp is mounted on the vehicle dashboard or cab sidewall as convenient. The mounting stalk can be secured into the two clamps as required to give a wide variety of mounting arrangements. The bar may be cut down to suit.



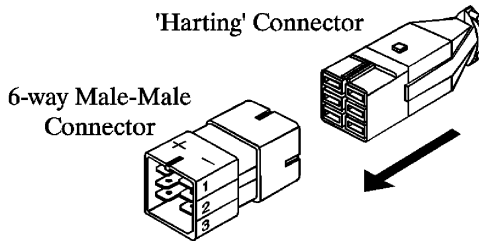
3 - Instrument Connectors

3.1 Power Supply and Sensors

The instrument is supplied with three flying leads terminating in three, colour-coded 6-way 'Harting' Connectors :

- e **Grey Connector** for power supply, speed sensor and area override sensor.
- e **Blue Connector** for grain yield sensor and Hillside sensor.
- e **Red Connector** for optional moisture sensor.

All principal sensor cables and power supply cables are connected to a mating 6-way male-male connector to create a quick release connection between the instrument and the vehicle. This permits easy removal of the head unit for transfer to another vehicle.



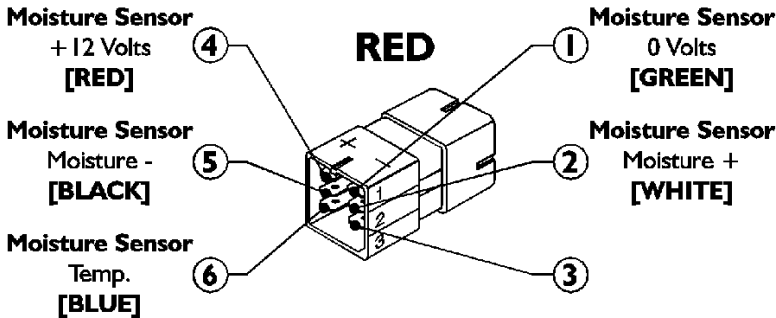
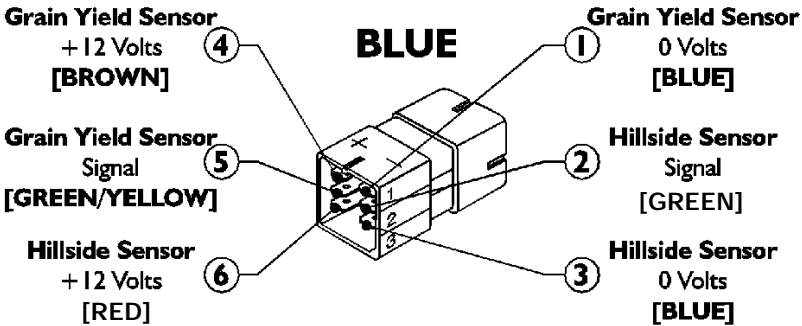
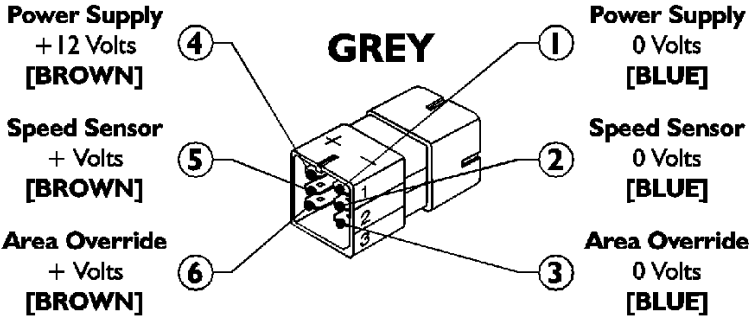
The 6-way male-male connector is supplied with a cable identification label.

This connector must be coupled to the flying lead with the labelled end **away** from the instrument, i.e. the individual sensor cables are connected immediately adjacent to the label.

NOTE: It is recommended to fit the male-male connector to the flying lead before starting installation.

3 - Instrument Connectors

3.2 Cable Connections



3 - Instrument Connectors

3.3 Cutting Width Switch

There is a 12 way rectangular connector on the rear of the *Ceres 2* instrument. This is for the Cutting Width Switch.

3.4 Serial Communications lead

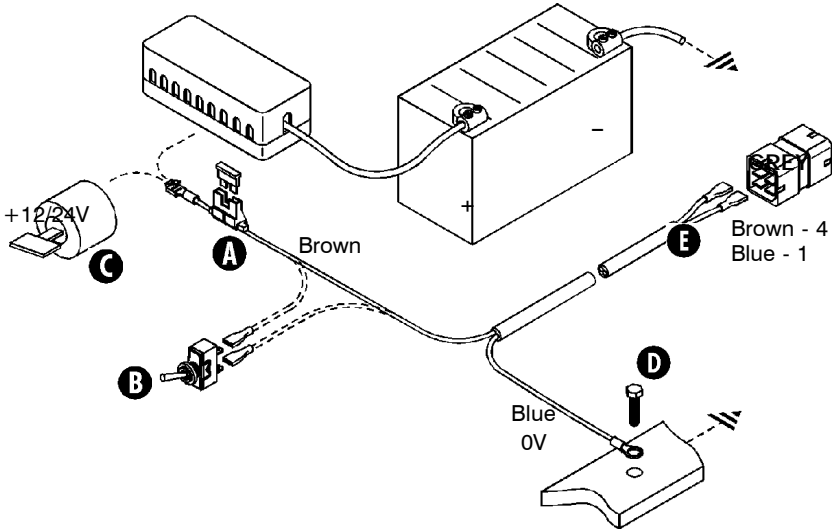
The flying lead with 9 way 'D' connector is the serial communications lead.

It is used to transmit data from the *Ceres 2* instrument to a printer/PSION or to the RDS *Hermes*, for yield mapping data.

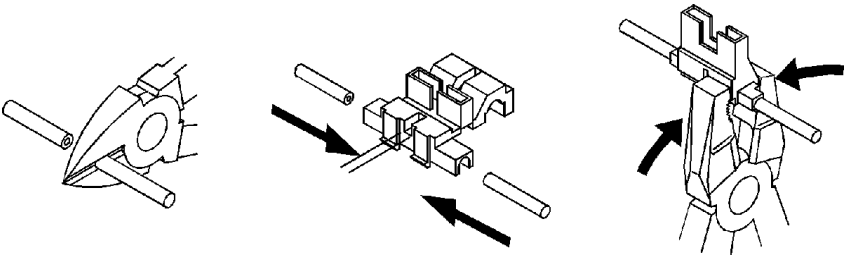
4 - Power Supply

Ceres 2 will work directly from a 12v or 24v negative earth electrical system with no requirement for a voltage dropper.

Kit ref. K/INSTRUMENT

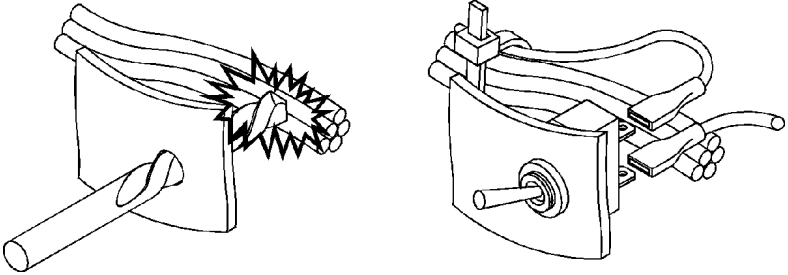


- A** Insert fuseholder (2A fuse) as close as possible to +V supply.



4 - Power Supply

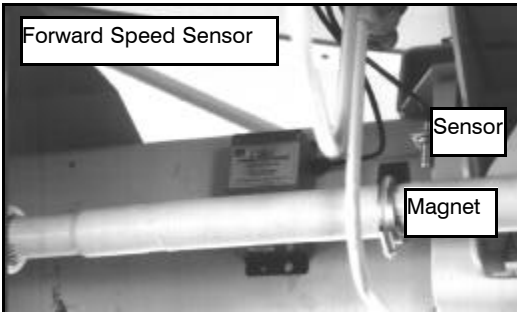
- B** If desired, fit power supply on-off switch S/AC/199-2-134



- C** Connect onto a convenient switched, fused terminal.
- D** Connect to vehicle body/chassis. Make contact to bare metal and ensure connection point makes a good earth return to battery.
- E** Connect to Harting.

5 - Speed Sensor

Ceres 2 is normally supplied with a magnetically operated prop shaft speed sensor. This can be installed on any exposed shaft which rotates at a speed proportional to ground speed, i.e. when there is no variable gear or drive ratio between the shaft and the wheel. On most combines there is an exposed half shaft available between the gearbox and each drive wheel of the combine.



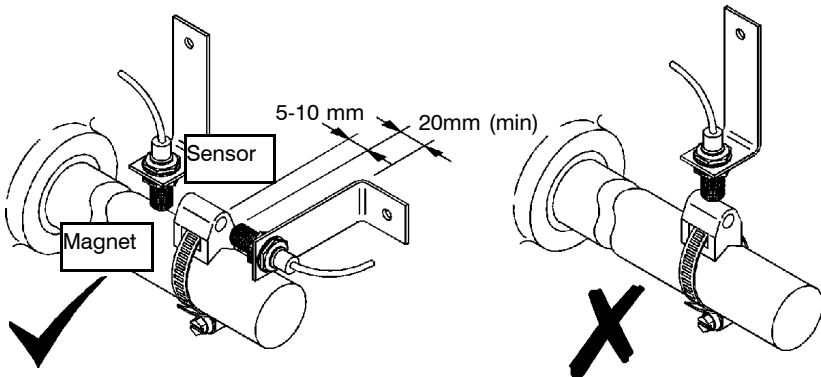
The plastic moulded magnet carrier sits on the shaft and is secured by a hose clip or nylon cable tie.

The sensor is the 12mm diameter x 45mm long threaded cylindrical unit. It is held and secured in its bracket by the two M12 nuts.

At least 20mm of the sensor must protrude clear of the fixing nuts.

Otherwise the sensor and bracket can be arranged as convenient to ensure that the magnet passes the sensor in any one of the relationships shown below :

Run the cable via a well protected path using cable ties to secure the cable to existing wiring looms, hydraulic hoses etc. Connect the cable leads - blue to terminal '5', and brown to terminal '2' of the grey connector.

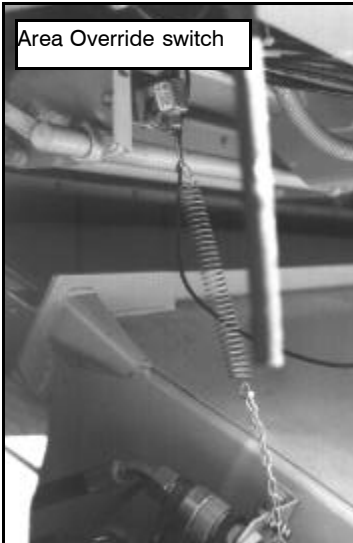


6 - Area Override Switch

Cere
t h e
w o r k
"P u l l
c o m -

T h e
f i x e d
u n -

T h e
w h i c h
a n d
b e -
h e i g h
t b y
c h a i n
f a s -



s 2 requires a switch to recognise when combine is in work and when it is out of . The standard cut out switch supplied is a "In Type" i.e. when the switch is pulled the combine is in work.

switch is mounted on a bracket which is to a suitable panel or support on the underside of the combine cab.

switch is operated by a length of chain which connects to the combine table trunking which is pulled when the table is lowered to and below the normal cutting height. The height at which the switch trips can be adjusted by altering the effective chain length. The chain links can be opened out to take an M6 nut.

Ensure that the following points are observed :

- e The spring is not overstretched when the table trunking is right down on the ground. The trunking will drop lower when the table is removed.
- e The switch cannot be crushed and does not interfere with any controls, cables or hydraulic hoses when the table is fully lifted.

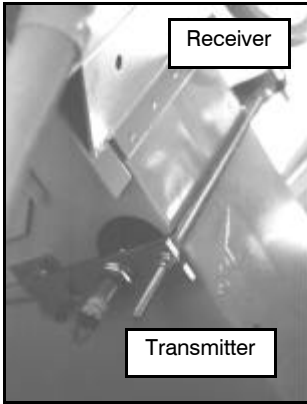
Connecting the Area Override switch

- 1 Use the two core cable to connect the cut out switch terminals to the grey six way connector.
 - 2 Run the cable via a well protected path using cable ties to secure the cable to existing wiring looms, hydraulic hoses etc.
 - 3 Connect the cable leads - blue to terminal '6', and brown to terminal '3' of the grey connector.
- 3

7 - Grain Yield Sensor

Grain - (non elevator) sensor brochure

The lens holder



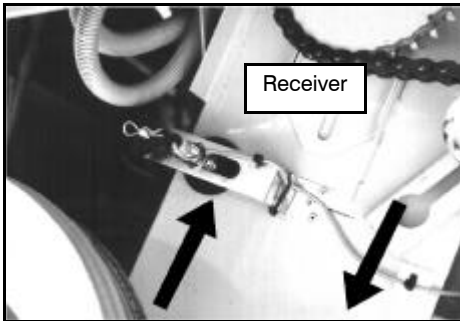
n Yield is measured by an optical sensor stalled on the clean grain elevator. An infra red (non-visible) light beam is transmitted across the elevator paddles from one side to the other. A receiver detects when the light beam is clear and when it is broken. As each paddle passes the sensor, the beam is broken. The more grain there is on the paddle, the longer the time that the beam is broken.

transmitter and receiver together with their lenses and lens holders, are each secured to a common mounting bracket which is riveted to the elevator housing.

Sensor positioning

The close side of the CLAAS

The sensor (or combines



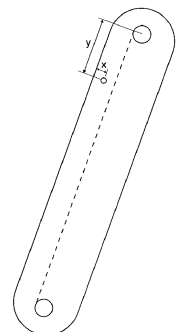
sensor should be mounted as close to the top of the clean grain elevator as possible on the UP side of the elevator. (This is normally the rear half of the elevator but on CLAAS combines excluding LEXION models, it is the front half.)

critical dimension (X) for the sensor installation is the distance in from the rear face of the elevator housing to the front face on CLAAS combines

other than LEXIONS).

The X and Y dimensions are specified for most makes and models of combine and **must** be maintained for the calibration data suggested in the *Ceres 2* Calibration Instructions, to be valid.

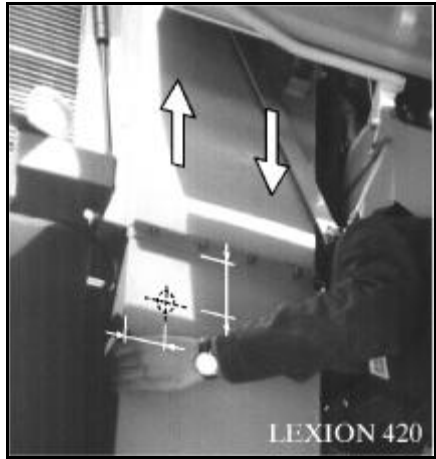
On combine models where no dimension is given, the sensor should be positioned such that the beam is broken by the elevator paddle only and not by the paddle support bracket (see overleaf). This dimension can be determined



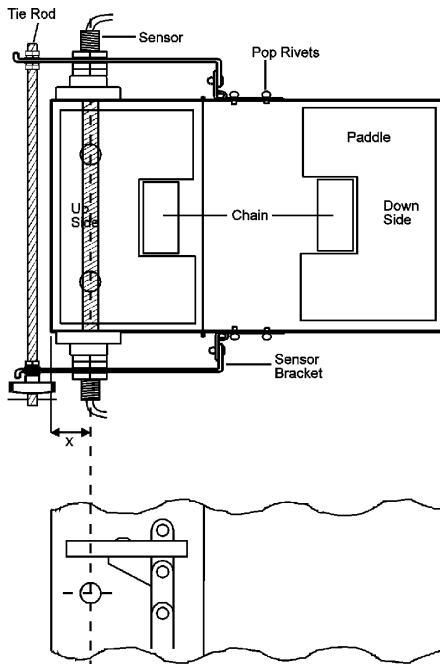
7 - Grain Yield Sensor

NOTE: The LEXION elevator goes in the opposite direction to all other CLAAS combines, so the sensors must be fitted towards the rear (upside) of the casing (fig. A).

Fig. A



Sensor location to avoid paddle support



7 - Grain Yield Sensor

7.1 Clean Grain Elevator sensor position

The sensor position is extremely important. All calibration data provided is dependent on the recommended sensor position therefore;

THE SENSOR MUST BE FITTED IN THE CORRECT POSITION.

Please refer to the Installation / Calibration data addendum (UK183.DOC) supplied with the Ceres 2 instruction manuals, which specifies the required position for a wide range of combines.

7 - Grain Yield Sensor

Fitting the sensor assembly

The transmitter and receiver are similar in construction but are identified by a label on the body.

It is advisable that the receiver is installed such that its L.E.D. is visible. This will allow easy checking of correct operation.

It is important that the fixing rivets are located close to the centre of the trunking immediately adjacent to the internal partition. This ensures that the rivets inside the elevator are in dead space and not in danger of being hit by paddles on the 'down' side of the elevator.

The light beam must pass across the elevator paddles and a 20mm hole is required on each side of the elevator trunking for the light beam.

It is necessary to gain access to both sides of the elevator trunking in order to drill the fixing holes and beam hole. On some combines it is possible to install the sensor on a section of the elevator inside the grain tank.

- 1 Drill the three 4.8mm diameter rivet holes and the 20mm diameter sensor hole in each side of the elevator. Thoroughly clean and debur the area around the 20mm holes.
- 2 The brackets should now be secured onto the trunking using three 4.8mm dia x 10 mm blind rivets.
- 3 The transmitter and receiver are now located in their brackets but the fixing nuts should not be tightened at this stage.
- 4 Screw the lens assembly onto the receiver and transmitter just until the sensors touch the back of the glass lens. Use the third fixing nut as a locking nut to secure the sensors to the lens holders.
- 5 The sensor fixing nuts can now be adjusted and tightened onto the brackets so that the lenses fit centrally in the 20mm holes and the sensor brackets are parallel with the sides of the elevator when the foam gaskets are lightly compressed.

The two sensor brackets are secured by a threaded tie rod which links the two brackets across the back of the elevator housing.

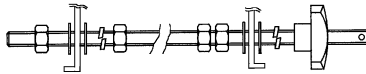
7 - Grain Yield Sensor

Tierod Assembly for Grain Sensor Brackets

- 6 The tie rod should be assembled as shown in the diagram to allow the sensor brackets to be released and opened out for cleaning.

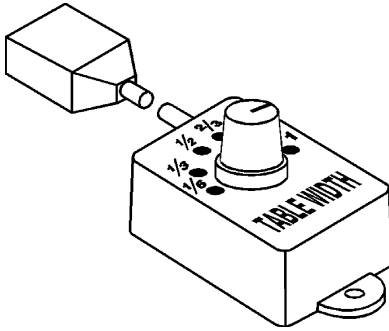
Ensure that the 'R' pin is used as security in case the handwheel should vibrate loose.

- 7 Use a cable tie to secure the sensor cables to the bracket and to secure the connector to an existing cable loom, body panel, or hydraulic hose for mechanical support.
- 8 A mating cable is supplied which plugs into the sensor assembly. Run this cable forwards and into the combine cab via a suitably well-protected path.
- 9 Connect the brown lead (+12v) to terminal '4', the blue lead to terminal '1' and the green/yellow lead to terminal '5' of the **blue** connector.
- 9



8 - Cutting Width Switch

This switch unit should be located on the combine dash in a position which is convenient to the operator. It is simply screwed down with two self-tapping screws. The cable should be run up to the rear of the *Ceres 2* head unit and plugged into the 12-way connector.



9 - Hillside Sensor

Movement over sloping ground alters the distribution of grain on the elevator paddles and affects grain measurement. The angle sensor compensates for this effect. It measures the angle of slope in two axes:- left-right (L-R) and front-rear (F-R) giving a voltage output from 2V to 4V (-15° to +15°).

NOTE: The sensor functions only as a single axis sensor with the Ceres 2.

The sensor has the same sealed diecast metal housing as the old type single axis sensor. Unlike the old type sensor it has no moving parts and does not contain silicone oil.

9.1 Parts list - Kit ref: K/DUAL/AXIS/HIL

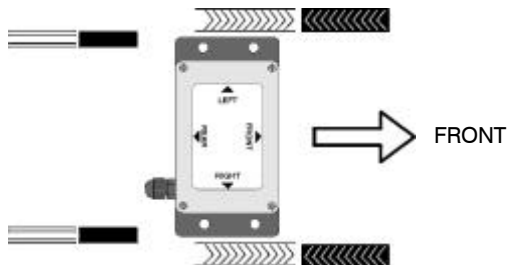
Part No:	Q ty:	Description:
S/SR/182-5-004	1	D ualaxissensor
S/CB/500-1-035	1	4 -coreextensioncable
S/F5NR/601	4	M 6 x 30 hex. set screw
S/F5NR/406	4	M 6nut
S/F5NR/940205	4	M 6plainwasher



9.2 Mounting the angle sensor - standard orientation

Mount the sensor housing onto a convenient horizontal panel (where it cannot be accidentally hit) using the M6 fasteners supplied. If there is no suitable horizontal panel then mount the sensor horizontally onto a rearward facing vertical panel, using a suitable right-angled mounting bracket (not supplied).

The labelled face must be uppermost and sit level with the machine in both axes. The label also indicates the standard orientation. In the standard orientation the cable exits from the right hand side of the rear face of the housing.



9 - Hillside Sensor

Secure the sensor cable and connector with cable ties. Connect the extension cable and route forward to the Harting connectors. Cable-tie where possible to an existing wiring loom or hydraulic lines.

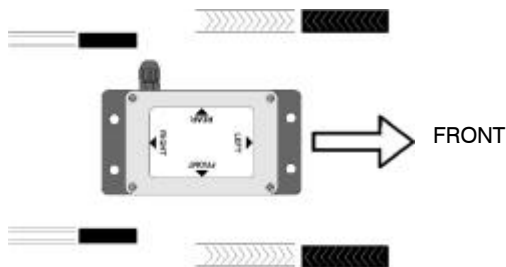
9.3 Connecting the angle sensor

Wire color	F unction	H artingterminal
Blue	0V	B LUE-3
Red	+V	B LUE-6
Green	L eft-rightsignal	B LUE - 2
Yellow	F ront-rearsignal	n/a

NOTE: The Front-Rear signal wire (yellow) is not used.

9.4 Mounting the angle sensor:- non-standard orientation

If mounting in the standard orientation is not convenient - e.g. for cable entry etc, then you can mount the housing rotated 90° CLOCKWISE from the standard orientation given on the label (note that the top face must always be level).



To maintain the correct input to the head unit, connect the YELLOW wire to terminal 2 of the blue Harting. The green wire is not used.

10 - Serial Communications Lead

The flying lead and 9-way 'D' connector on the rear of the instrument is the serial communications lead. It should be left accessible to allow connection to any peripheral device.

If *Ceres 2* is to be used to produce Yield Map data, then this lead is connected to a similar mating connector from the RDS *Hermes* instrument.

11 - Testing the Installation

- 1 **Switch** the combine ignition on and switch the *Ceres 2* on (if it has a separate power switch).

The display will come on and a display self test routine will run. Both displays are permanently illuminated.

- 2 **Drive** the combine forwards.

The analogue display will indicate a forward speed and will check that the speed sensor is operating.

- 3 **Lift** the cutter table right up.

*The chevron indicator on the lefthand display will be **flashing**.*

- 4 **Lower** the table until the override switch on the table trips.

*The chevron indicator on the lefthand display will now be **on permanently**.
If the table is on the combine :*

- 5 **Lift** the table to a suitable trip height and adjust the cut out switch to trip at this height.

- 6 **Run** the combine mechanism to run the clean grain elevator. With the elevator running, check that :

- *The red L.E.D. on the grain yield sensor **receiver** on the elevator is **flashing**.*
- *The green L.E.D. on the grain yield sensor **transmitter** is **on permanently**.*

- 7 **Press and hold**




*The lefthand display will flash **tArE**' and the righthand display will show a number. If a number greater than **0.0** is displayed, then the sensor and instrument are working.*

11 - Testing the Installation


Initial Calibration of the Hillside Sensor

If a hillside sensor is **not** installed, then the Slope Correction Factors must be set to zero whilst the *Ceres 2* unit is set to 'Calibration Mode 1'.

Ref.  12 Calibration Instructions for further details.

Once a hillside sensor has been installed, the angle reading must be zeroed as follows :

1 Stand the combine on level ground.

2 Press and hold the unmarked switch to the left of  for 15 seconds.

The lefthand display will show 'AnG' and the righthand display will indicate the both a digital display of degrees, and an analogue indication of slope.


*When the analogue display indicates vertical, the digital display will show **0.0** degrees of side slope.*

3 Press and hold  for 5 seconds.

The Ceres 2 unit will give 5 bleeps and the righthand digital display will then zero.

The system can now be fully calibrated. Refer to the Calibration Instructions for further details.

NOTE: If a Grain Moisture Sensor Kit is installed, it must be programmed 'on' and calibrated via 'Calibration Mode 2'.

Ref.  16 Calibration Instructions for further details.



Your local distributor is:

