KEE

PRECISION FARMING CONTROLS

VARIABLE
SEED RATE CONTROLLER

OPERATION & INSTALLATION
INSTRUCTION MANUAL

FOR

ELECTRIC MOTOR DRIVE
ELECTRIC ACTUATOR DRIVE
(ZEROMAX)

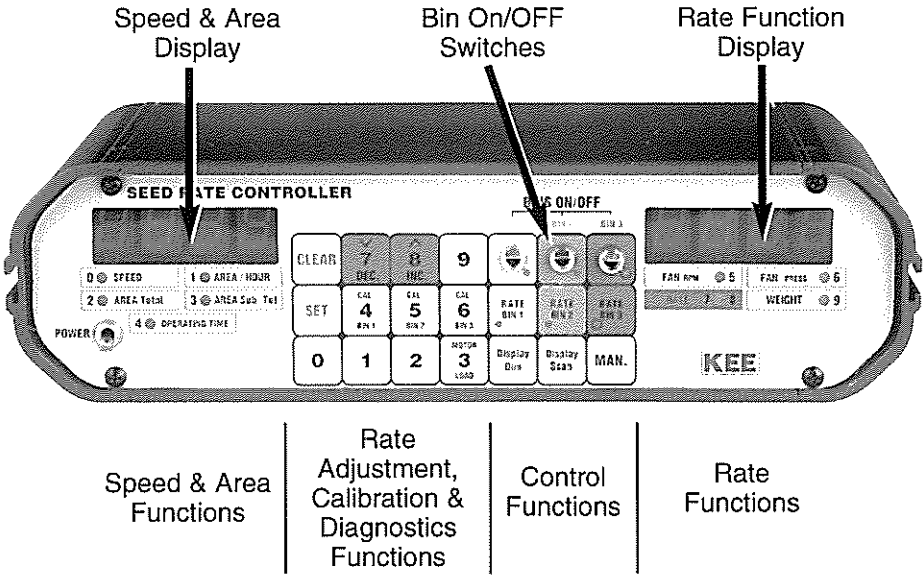
DON'T JUST MONITOR...

...TAKE CONTROL!

A QUICK OVERVIEW

This unit is designed to automatically control all functions of the Airseeder utilising Electric Motors coupled directly onto metering rollers or operating Electric Actuators fitted to a ZeroMax Gearbox. Refer DIP SWITCH SETTINGS.

A sensible Operator Console Layout



IMPORTANT NOTES

Please record the details below which will ensure that you have all necessary information at hand when you need it quickly.

SERIAL NUMBER OF CONTROLLER: _____

MODEL & SERIAL NUMBER AIR SEEDER: _____

PURCHASED FROM (DEALER): _____

PURCHASE DATE: _____

!!!! Do NOT connect Computer to POWER unless you have read the Fitting Instructions!

USER'S CALIBRATION FIGURES FOR QUICK REFERENCE

For a 2 Bin Airseeder, Tractor must be fitted with an alternator capable of 80 Amps load. Check your total load with all lights and AC on. **Allow 40 Amps for SRC Motors.**

For a 3 Bin Airseeder, Tractor must be fitted with an alternator capable of 100 Amps load. Check your total load with all lights and AC on. **Allow 60 Amps for SRC Motors.**

TABLE OF CONTENTS

FEATURES

DISPLAY

The operator can select a variety of functions for display on each of the right and left hand digital displays.

POWER SWITCH

The computer is turned on and off by a switch on the front panel.

CONTROL SEED / FERTILISER RATE

The controller will automatically adjust the seed/fertiliser application rates to that requested, compensating for changes in tractor speed and is adjustable up/down on the move to any desired rate, within the limits of the gear set fitted to the seeder.
The computer needs three inputs :-

a : Ground Speed

b Drive Motor Speed. (80-100 pulses per drive shaft revolution). ELECTRIC MOTOR DRIVE ONLY

c: Metering Shaft Speeds

From these and the active implement width it calculates the seed/fertiliser rate in either kilograms/hectare or Pounds/acre. (See DIP Switch select). This value is compared with the required seed/fertiliser rate. If the rate is too low, the computer speeds up the motor to increase the seed/fertiliser rate. If the rate is too high, the motor slows down. When the two rates are equal, the motor maintains that speed.

CONTROL BINS

The operator can turn up to 3 Bins on or off and control the modes of operation from the keypad. The seed/fertiliser rate is automatically adjusted to the requested rate as the Bins are switched.

ALARMS

Audible alarms are given when shaft speeds, fan pressure and motor load goes outside its limits or the Bin becomes empty. When alarms sound, they can be cleared by pressing the CLEAR button.

UNITS & COUNTRY SETTINGS

The controller is pre-set to Australian Standards to display units as follows.

Speed	Area	Rate
km/hr	Hectares	kg/hectare

The units can be changed to standards of USA, Canadian Imperial or Canadian Metric. Please consult DIP Switch select for implementing unit changes.

AUTO MODE

In AUTO Mode, the controller will adjust the Electric Motors or Actuators to control the seed/fertiliser rate to the programmed value regardless of variations in the ground speed. If any Bin switches are ON, the unit is in automatic control unless the MAN button is pressed. MAN can only be selected if there is no speed sensor pulses detected.

DISPLAY FUNCTIONS

Each of the right and left hand displays has a group of LEDs associated with it. One of these is lit for each function, and the legend alongside each LED tells you what function is being displayed. Any function may be displayed at any time without affecting the operation of the controller.

LEFT DISPLAY

KEY 0 Ground speed is displayed in kilometres per hour.

KEY 1 Area per hour is displayed in Hectares or Acres per hour. This is adjusted to reflect the area actually covered by the implement.

KEY 2 Area Total is displayed in Hectares or Acres. Can be cleared by holding in for 3 seconds.

KEY 3 Area Subtotal is displayed in Hectares or Acres. Can be cleared by holding in for 3 seconds.

KEY 4 This logs the actual seeding time. Can be cleared by holding in for 3 seconds.

RIGHT DISPLAY

KEY 5 Monitors Fan rpm with a low rpm alarm.

KEY 6 Monitors Fan Pressure (Optional Sensor kit) with a low & high pressure alarm.

KEY 7 & 8 Rate of application of each of up to 3 Bins. The displayed rate can be increased or decreased at anytime Bin number then 8 or 7 within 3 seconds. Each press increments an Inc unit change.

KEY 9 Weight in pounds or kilograms left in the selected Bin. When empty an alarm sounds on the Bin switch. By selecting a Bin and holding in for 3 seconds resets this Bin to full.

FEATURES

DUAL 4 DIGIT LED DISPLAY

The left display is for speed and area functions.
The right display is for the seeding functions.

DISPLAY DIM

This reduces display intensity for night work.

DISPLAY SCAN

This scans the 3 Bins. If RATE was selected before the Scan button, the display scans the Bin rates for 3 second duration's. If WEIGHT was selected before the Scan button, the display scans the Weights for 6 second duration's. This will also scan the Motor Loads, ZeroMax Rate and Motor Currents during operation. This should be used at all times.

PRESSURE SENSITIVE KEYPAD

All functions are controlled from the keypad. Mechanical switches impervious to wear, dust and moisture operate the Bin motors or Actuators.

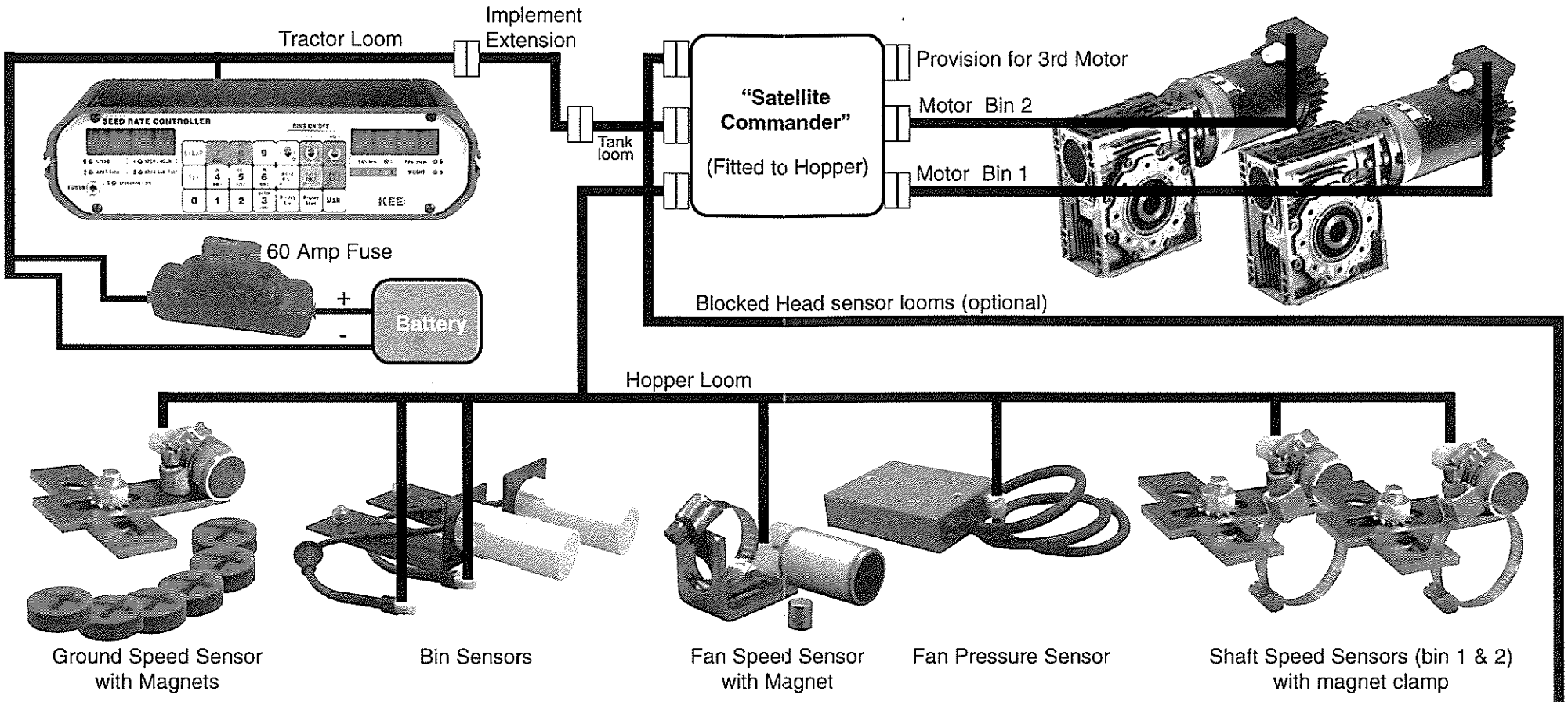
BUILT-IN MEMORY

The calibration information and current areas and volumes are held in memory while the computer is removed from the tractor.

ALUMINIUM BOX

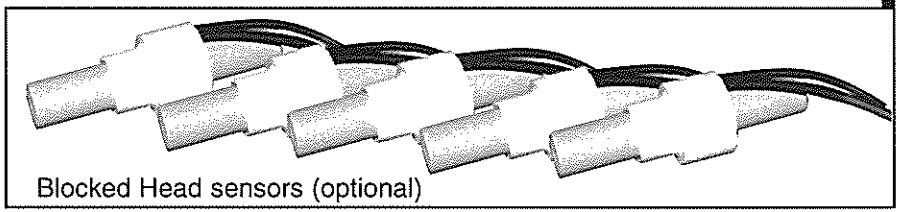
Will not melt or distort under extreme temperatures. Modular construction allowing internal module to be removed from the front for DIP Switch settings.

SYSTEM COMPONENTS



COMPONENT LIST FOR 2 BIN RATE CONTROL UNIT

Item	Part Number	Qty
Control Box	A542	1
Tractor Loom	A544	1
Implement Loom	A546	1
Hopper Loom	A263	1
Central Control Unit	A543	1
Ground Speed Sensor	A026	1
Ground Speed Sensor Magnet Clamp	A007	1
Motor (with gear box and internal speed sensors)	A391	2/3
Shaft Speed Sensor	A026	2/3
Shaft Speed Sensor Magnet Clamp	A007	2/3


Blocked Head sensors (optional)

Item	Part Number	Qty
Ground Speed Sensor Magnets	Z098	6
Fan Speed Sensor	A026	1
Fan Speed Sensor Magnet	A361	1
Fan Pressure Sensor	A267	1
Bin Sensor	A029	2
Blocked Head Looms Kit (optional)		1
Blocked Head Sensors (optional)	A021, 022, 023	1-15

REFERENCE SUMMARY

Left Display shows area functions, selected by pushing the appropriate button.

0 Ground speed in kph or mph.

1 Area/time in Hectares/Hour or Acres/Hour.

2 Total area in Hectares or Acres, can be cleared by holding in for 3 seconds.

3 Subtotal area in Hectares or Acres, can be cleared by holding in for 3 seconds.

4 Operating time in hours, can be cleared by holding in for 3 seconds.

Right Display shows seeder functions

5 Fan speed in rpm

6 Fan pressure in KPa

7 DEC. 8 INC. Selects Bin rate in Kg/Ha or lbs/Acre. If either button pushed within 3 seconds of pushing a Bin button, the rate will increase or decrease for that Bin.

9 Bin weight (Volume) left in Kg or lbs, re-set when the Bin is re-filled by holding in the Bin button for 3 seconds.

The Bins are turned on/off by the toggle switches.
The 3 Bin select buttons below the toggle switches select which Bin is shown on display for either rate or weight.
The controller will adjust the motor speed or actuator position to hold the rate at the selected rate as the ground speed changes.

The Manual button allows you to hold the monitor speed constant, if tractor is stationary and the seed rates are held at the rate selected to allow manual control of the rates.
Holding this button in for 3 seconds while driving also allows GPS on/off connection if controlling from variable rate maps.

Switching on any Bin toggle returns to normal automatic control.
The DIM button toggles between bright and dim display for night work.
The SCAN button selects each Bin in turn, at a 3 second interval when in rate or weight modes 7,8 or 9, showing either the actual seeding rate for each Bin, or the weight left in each Bin. This saves some manual button pushing. Scan is cancelled by pushing any other numeric key, or manually selecting a Bin. If a rate alarm occurs when in scan mode, the display reverts to the alarmed Bin displaying the actual rate.

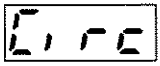
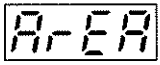
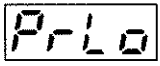
REFERENCE SUMMARY

SET

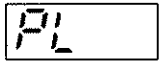
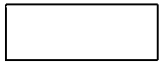
SET FUNCTIONS

Each button has an associated set/calibrate function, accessed by pressing the number button, then the SET button.
Once in SET mode, the controller is stopped, and the left display shows a message to indicate that something is being SET.
Numbers are entered onto the right display using the buttons as a numeric keypad. Never attempt to SET any functions if any Bin switches are on.
The existing entry must be cleared before any new entries can be made whenever data is entered.
Once the correct number is entered on the display, the SET key is pressed again, and the entry is stored permanently in memory.
The next SET function is then accessed, or the display returns to normal, depending on whether there are more things to SET with this button.
While in SET mode, the appropriate indicator LED flashes slowly, to warn that you have not completed an entry.
Note: Always CLEAR (Hold for 3 seconds) old settings before entering new data.

0

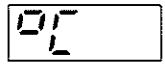
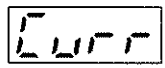
SET	1st press		Enter circumference for the ground speed calibration.
SET	2nd press		Enter Width of seeder in metres.
SET	3rd press		Min fan speed rpm for alarm.
SET	4th press		Min fan pressure for alarm.
SET	5th press		Reverts back to display

1

SET	1st press		Set speed for the manual control system. This should be your normal working speed and is used for the Bin calibration also.
SET	2nd press		Pre-load time for start-up. ELECTRIC MOTOR DRIVE ONLY
SET	3rd press		High pressure alarm for fan..
SET	4th press		Reverts back to display

REFERENCE SUMMARY

DISREGARD THIS SECTION ON BUTTON 2 - FACTORY PRE-SET

2 SET	1st press		Approximate Outside air temp. in Deg. centigrade.
SET	2nd press		Factory set.
SET	3rd press		Reverts back to display.
3 SET	1st press		Motor Load,Actuator position, 0 -100%.
SET	2nd press		Motor current in Amps, max. 20Amps. **ELECTRIC MOTOR DRIVE ONLY**
SET	3rd press		Reverts back to display.

Calibrating Bin 1.

4 SET	1st press		Refer PROGRAMMING & SETTING VALUES
SET	2nd press		Refer PROGRAMMING & SETTING VALUES
SET	3rd press		Refer PROGRAMMING & SETTING VALUES
SET	4th press		Refer PROGRAMMING & SETTING VALUES
SET	5th press		Refer PROGRAMMING & SETTING VALUES

REFERENCE SUMMARY

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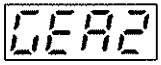
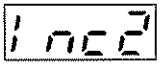
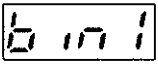
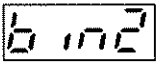
Calibrating Bin 2

SET	1st press		Refer PROGRAMMING & SETTING VALUES
SET	2nd press		Refer PROGRAMMING & SETTING VALUES
SET	3rd press		Refer PROGRAMMING & SETTING VALUES
SET	4th press		Refer PROGRAMMING & SETTING VALUES
SET	5th press		Refer PROGRAMMING & SETTING VALUES

6

SET	**Calibrating Bin 3** **Same procedure as Bin1 & 2**	Refer PROGRAMMING & SETTING VALUES
SET		
SET		
SET		
SET		

7 DEC. or 8 INC.

SET	1st press		Set the Bin 1 rate in Kg/Ha.
SET	2nd press		Locks in Bin 1 Rate. Enter the Bin 2 Rate.
SET	3rd press		Locks in Bin 2 Rate. Enter the Bin 3 rate.
SET	4th press		Locks in Bin 3 Rate. Reverts back to display.

REFERENCE SUMMARY

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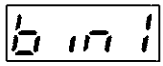
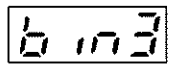
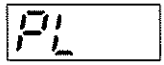
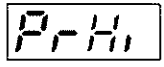
SET	1st press		Enter Bin 1 total weight in Kg.
SET	2nd press		Locks in Bin 1 weight. Enter Bin 2 total weight in Kg.
SET	3rd press		Locks in Bin 2 weight. Enter Bin 3 total weight in Kg.
SET	4th press		Locks in Bin 3 weight. Reverts back to display.

PRELOAD TIMER ELECTRIC MOTOR DRIVE ONLY

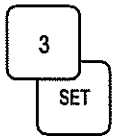
When you first switch on any Bin toggles while stopped, the controller will turn on the feed motors for the preload time in seconds to start feeding the Airseeder. This allows the feed system to start loading the seeder to allow for the time delays in starting feeding. The rate this discharges material is at the manual speed setting, so you must SET both the preload time PL to a reasonable value for your seeder, and the manual speed SP to your normal working speed. Then when you drive off within the preload time (5 -10 seconds or so) seed/fertilizer will already be flowing. As soon as you approach normal ground speed, the controller will take over. If you don't drive off, the preload timer will stop feeding, so that you don't fill the seeder.

1

SET	1st press		Set speed for the manual control system. This should be your normal working speed in km/h and is used for the Bin calibration also.
SET	2nd press		Locks in manual speed. Enter pre-load time for start-up in seconds. ELECTRIC MOTOR DRIVE ONLY
SET	3rd press		Locks in pre-load time. Enter fan high pressure alarm.
SET	4th press		Locks in high pressure fan alarm. Reverts back to display.

REFERENCE SUMMARY

Motor Load



The SET function for button 3 is not actually for Setting anything, but allows you to read the % Motor Load or Actuator position in a working situation. This works only on 1 Bin at a time, and is helpful when Setting up, and adjusting the machine feed rates.

If you are driving normally, and the motor load or actuator position is consistently too high, up near 100%, you should adjust the Airseeder (Gear down, lower gear ratio on distribution shaft, or remove metering roller blank off plates) to feed more seed per rev on that Bin. Similarly if the motor load is consistently too low, say under 20%, (10% for Actuator) you will get smoother control by feeding less seed per rev, so that the motor runs faster. (Gear up, higher gear ratio on distribution shaft, or fit blank off plates.

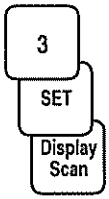
ELECTRIC MOTOR DRIVE ONLY

The second SET function here shows the approximate motor current, and is for diagnostic use only. This should run at a maximum of 20 amps, generally around 9 - 12 amps. It is helpful to note the current under normal use, then if you are having problems with feeding later, and the motor current is seen to be abnormally high or intermittantly jumping up, this will indicate a jamming or jammed shaft or bearing.

The third SET reverts back to display.

DISPLAY SCAN

Pressing this sets the right hand display scanning whatever was previously selected across the 3 bins. If Rate was previously selected on either button 7 or 8 and then Bin Rate is displayed for 3 seconds and then moves on to the next.
Display Scan can only be used to sca **Rate.**
Weight (Volume in Bin).
Motor Load.
Motor Current ELECTRIC MOTOR DRIVE ONLY



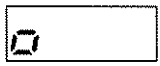
During normal seeding, the Motor Load and Motor Current should be checked. For optimal available range on motors, it is recommended to have the motor loads running between 30% and 70% at your normal planting speed. (10% and 90% for Actuator)
When seeding at this normal speed, simply press: **3, SET, Display Scan.**
Now the Motor Loads in % will be scanned and displayed.
This reading is not critical, but if it is near 100%, the Rate alarm may intermittently come on. Also there is no allowance for any increase in speed on this Bin if it is required. Replace sprockets if this occurs.

Now check the Motor Current being drawn by each motor.
From the above situation simply press: **SET**
Now Motor Current will be displayed and continue scanning. The motors are rated at a maximum of 20 Amps and should not be continually driven greater than 16 Amps. If any currents are greater than 16 Amps, this means the distributor mechanism may be jamming. Contact KEE immediately.

Pressing SET again reverts back to display.

REFERENCE SUMMARY

WARNING DISPLAY for RATE CHANGE & MASTER SWITCH



This appearing in the Right Hand display signifies a Rate alteration from that programmed.

-symbol rotating indicates :

1) a Bin has recently been switched off, this will stop after 60 seconds or if Bin is switched back on or CLEAR button pressed.

2) 1 or more Bin rates have been alterred from those programmed, this will continue until Bin button pressed and held for 3 seconds reverting back to programmed rate, or CLEAR button pressed.

-symbol flashing indicates Master Switch has been disengaged, switching off all Bins, this will continue until Master Switch is turned back on.

ALARMS

The beeper will beep, and one of the indicator LEDs will fast flash if something goes wrong.

INDICATOR LED

0 Ground Speed No ground speed when a Bin toggle is on

This will occur any time you stop with a toggle on, and is intended as a warning only. If the alarm goes off when you are moving, the ground speed sensor should be checked immediately. Seeding is not possible without ground speed, unless you switch to manual mode MAN, and then drive at the set speed SP. This is under button 1 and should be set to your normal seeding speed.

If the speed sensor input is lost, this speed should be set correctly and driven to closely until the speed sensor input is regained. Driving in MAN mode is intended for emergencies only.

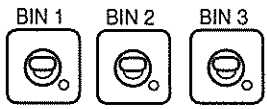
5 Fan Speed Fan Speed below alarm speed

6 Fan Pressure Fan Pressure below min pressure set, or above maximun pressure set.

7 Rate The max. Motor speed is exceeded or Actuator at full stroke.
This is a warning to either drive slower, or change the bin sprockets allowing the metering roller to turn faster.

9 Weight bin empty

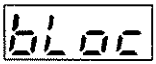
Bin 1 Toggle	Weight	Bin1 empty
Bin 2 Toggle	Weight	Bin2 empty
Bin 3 Toggle	Weight	Bin3 empty



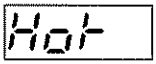
A flashing alarm can be cancelled by pressing the appropriate button.
If the alarm starts again immediately, rectify the problem.

REFERENCE SUMMARY

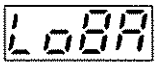
OTHER POSSIBLE ALARMS SHOWN ON THE LEFT DISPLAY:



Airseeder sensor detects a blocked head (if fitted).



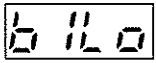
Satellite Commander Control box maximum temperature exceeded.



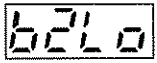
Low battery voltage detected.

Warns operator that all Bins are switched off, whilst driving along with the fan operating.

No communication with satellite control box because main cable plug is disconnected - no seeding is possible if this alarm is showing. (see TROUBLE SHOOTING)



Bin 1 level sensor detects low material.



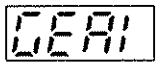
Bin 2 level sensor detects low material.

Bin 3 level sensor detects low material (if fitted)

Bin 1 shaft stopped or incorrect gearbox ratio entered.

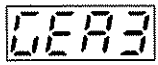
Bin 2 shaft stopped or incorrect gearbox ratio entered.

Bin 3 shaft stopped or incorrect gearbox ratio entered.



Bin 1 Gear Ratio incorrect. ELECTRIC MOTOR DRIVE ONLY

Bin 2 Gear Ratio incorrect. ELECTRIC MOTOR DRIVE ONLY



Bin 1 Gear Ratio incorrect. ELECTRIC MOTOR DRIVE ONLY

CLEAR

These alarms are all clearable by pushing the CLEAR key. If the alarm starts again immediately, rectify the problem.

The CLEAR key also allows you to clear the areas and time. You must hold the key down for 2 sec (a second beep sounds) before the clear takes effect. Alarm clears are immediate, to avoid clearing areas inadvertently.

OPERATION

DAILY OPERATION

Turn on Computer using the power switch on the front of the control box after first starting the tractor.
The display starts up showing "0" SPEED on the left display and RATE on the right.
Always select SCAN when driving and notice SPEED and RATES on each Bin are correct.

CONTINUING A FIELD

Fill the Bin/s if necessary and press 9 and appropriate Bin1,2 or 3. Press and hold the Bin button for 3 seconds to clear this and refill Bin in the computer. This then runs down to zero. Or if material is still in Bins simply drive off. Select 7 or 8 (RATE) and SCAN.

STARTING A NEW FIELD

Fill the Bin/s and press 9 and appropriate Bin. Press and hold Bin button to refill Bin in the computer. This then runs down to zero.

CHANGING SEED/FERTILISER RATE ON THE GO.

Press appropriate Bin then immediately press 7 or 8 repeatedly to increase or decrease Rate. (7 or 8 must be pressed within 3 seconds of selecting Bin or Rate will not increment/decrement). Rotating symbol in RH Display signifies a Rate change from that programmed. To clear symbol, press CLEAR or press and hold Bin button for 3 seconds to revert to programmed Rate. If power is turned off or lost. rates revert to main programmed Rate.

CHANGING SEED/FERTILISER PROGRAMMED RATE.

Press any Bin button, press SET and program in Bin 1,2 and 3 Rates using the number keypad and CLEAR button. As each RATE is entered, press SET to lock it in and move to next Bin. The old Rate must be cleared before a new Rate can be entered.

STARTING A NEW FIELD

Press 2 to read the current Area Total and press and hold 2 for 3 seconds if you want to re-set it to zero.
Press 3 to read the current Area Sub Total and press and hold 3 for 3 seconds if you want to re-set it to zero.

START PLANTING

Engage fan, throttle up, check rpm/pressure, turn the required Bins on, drive off. Initially, after switching on Bin/s, the motors drive the pre-load time (PL) set under button 1, then stop. This should be set to immediately meter seed/fertiliser from stationary to working speed avoiding unsown gaps. 3 - 10 seconds is recommended. As you drive off the Bin distributor shafts will then commence under automatic control. For Actuator units, these simply set themselves to the correct position ready to drive off.

STOP PLANTING

Simply stop and leave Bin switches on. You may just drive off again if you wish but by turning Bin switches off and then on as you move away, unsown start up patches are avoided by using the pre-load (PL) feature. If the fan is running and you are driving forward with a Bin on, the FLO alarm will sound. This is intended to alarm if working and all Bin switches are accidentally turned off.

CHANGING SEEDING RATES

Quite often Low and High rates are required at the same time from different Bins. For example Canola in one Bin and Urea in another. A high Gear ratio (Refer Specific Machine Operation) should be used for low rates eg. 60:1 and a low Gear Ratio should be used for high rates eg. 10:1. Different machines have different Gear Ratios available. Also for low rates, the increment setting for that Bin should be low eg. 0.5. For high rates, the increment setting for that Bin should be high eg. 10.0. This is up to the operator and quite often the Increment is set to half the working rate, so it can quickly be halved for headlands etc. In this situation, press and hold Bin button for 3 seconds to revert to programmed Rate.

MASTER SWITCH

This is a foot or hand operated switch which shuts off all Bins at once at corners etc.
This switch plugs into the small plug wire on the main tractor harness at the rear of the main console. This plug is also used for radar connection so both cannot be used at the same time.

Activating the switch sets the Rate change symbol in the RH display flashing indefinetly alerting the operator that all Bins are disabled.

DGPS CONNECTION

The smaller plug at rear of the control box allows direct connection to a DGPS Data Logger. When this is connected for automatic application from pre-drawn rate maps, the data logger automatically takes over control.

This is indicated by a flashing satellite dish symbol in the left segment of the right display. When the DGPS Data Logger is disconnected, the 3 bins continue at the last instructed rates. By pressing and holding MAN button for 3 seconds during DGPS operation, the the DGPS is put on hold indicated by the symbol not flashing. The controller then continues working at the pre-programmed rates allowing the operator to make any adjustments desirable.

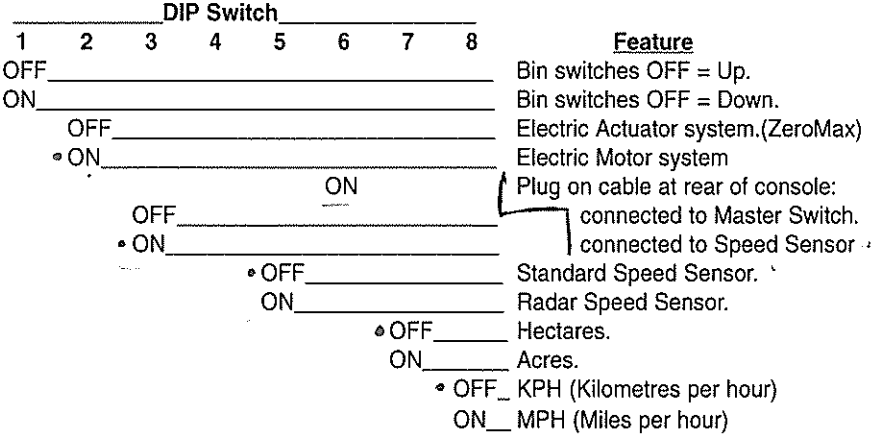
PROGRAMMING & SETTING VALUES

INITIAL START-UP

When the computer is first turned on some factors will already be programmed in, but these can be altered at any time. If the computer ever "Crashes" from severe electrical interference, the left display will show Cal. If this occurs, all factors must be re-programmed into the computer.

DIP SWITCH SETTINGS

A bank of 8 small switches exists on the main circuit board on the right side near the centre. These switches select various machines and operating functions of the computer.
Generally these are factory set to suit your new machine purchased but at times these may need to be re-set, for example if you wish to connect to a Radar Speed Sensor.
To gain access to these switches, remove the console module from the outer aluminium shell. To do this, remove locating screw on the rear of the box between the 2 white plugs.
Now remove the 4 corner front panel screws and lift the module out through the front of the box. Locate the small bank of switches. A fine pen will be needed to switch these. Notice that ON is switched away from the front panel and OFF is switched towards the front panel. Use care and only light forces when switching these as they are delicate.



SETTING A VALUE

The procedure for entering information is the same for all keys, with minor variations depending on how many factors are stored under each key.
Press the key corresponding to the function required, the LED will light.
Press SET, The indicator LED will flash slowly. A message will show on the left display to indicate which value is being SET. CLEAR entry (hold CLEAR button in for 2 seconds). The numeric keys now act like calculator keys, i.e. pressing a number puts that digit on the right display. The next number moves onto the right of the display in turn.
When the desired entry shows on the display, at the correct decimal point location, press SET again. Decimal place is shifted by entering zeros.
The number on display is stored and the next factor may be entered after clearing old value.
When the last entry has been made, the indicator LED stops flashing, to show that the full sequence has been entered for these functions.
The display reverts to normal, selected by the number keys as required.
This procedure sounds complicated, but once the method is learned, it is very quick to use. With practice, one can enter a complete set of information in about 30 seconds.

PROGRAMMING & SETTING VALUES

If a wrong entry is made, the CLEAR key may be pressed to clear the current entry on display. This has no effect on any other entries made previously.
If you attempt to enter a number larger than 9999, the display is cleared and the next number starts at the extreme right.
Stored values may be checked at any time by pressing the SET key to see the value stored (LED flashes) then the SET key repeatedly again until the LED stops flashing. This does not change any value in memory.

SETTABLE VALUES

(NOTE: When entering values, after pressing SET, CLEAR, use the numeral keys to enter correct number. To shift a decimal place, enter a 0.)

SPEED AND AREA FACTORS

0
SET

Press 0, then:
Press SET 1st time, displays Circ. Circ. = Dist. between speed pulses.
Requires 2 people to carry out. The wheel circumference has to be measured and the correct figure entered into the computer as follows.
This is actually the distance travelled on the ground between each sensor pulse measured in Mts.
This should be done with bins half full.
Drive forward slowly in a straight line, stop with a magnet aligned to the sensor and place a mark on the ground adjacent to some fixed part of the bins or wheel.

Now drive forward slowly approximately 15 mtrs. or longer (Not important).
Have another person count the magnets which pass the sensor. Stop when another magnet is aligned with the sensor and make a second mark on the ground adjacent to the same place on on the bins or wheel.

Measure accurately the distance between the marks in metres. The correct wheel circumference is then this distance divided by the No. of magnet passes. This should be in the range 10cm to 60cm A circumference of longer than this will give a long delay for the ground speed update, and cause slow response on the controller. Enter circumference for the ground speed calibration

SET

Press SET 2nd time, displays **Area** and locks in **Circ** entry.
Enter Implement Width for the machine being used in Mts.

SET

Press SET 3rd time, displays **Fan** and locks in **Area** entry.
Enter Fan alarm rpm for the machine being used. 1,000 to 4,000 is normal.

SET

Press SET 4th time, displays PrLo and locks in **Fan** entry.
Enter Fan Low Pressure alarm in KPa. This sensor is optional and should be left at 0 if not fitted. If fitted, 1 - 2 KPa is recommended.

SET

Press SET 5th time, display returns to SPEED and locks in **PrLo** entry.

PROGRAMMING & SETTING VALUES

AREA PER HOUR

1 — Press 1, then:

SET — Press SET 1st time, displays SP.
This is the MAN speed which should be your normal working speed.

SET — Press SET 2nd time, displays PL and lock in SP entry.

SET — Press SET 3rd time, displays PrHi and lock PL entry. Enter Fan High pressure alarm in Kpa. This sensor is optional and should be left at 0 if not fitted. If fitted, the operating pressure of the fan should first be studied before entering this value.

SET — Press SET 4th time, display returns to SPEED and locks in PrHi entry.

AREA TOTAL

2 — Press 2, then:

SET — Press SET 1st time, displays o C.
This is the outside temperature in Degrees C. This reading should be approximately the temperature outside. This is purely to indicate an overheating situation in the Satellite Commander caused by stalled motors.
This will not occur under normal operation.

SET — Press SET 2nd time, displays tCAL.
Factory set This has no effect on the operation of the unit

SET — Press SET 3rd time, display returns to SPEED and locks in tCAL entry.

CALIBRATE BINS

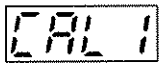
NOTE: All other factors must be programmed in before Calib
These include: SP, Rate, Gear and approx. Cal factor (0.6)

4

Calibrating Bin 1

SET — 1st press — 

This indicates that Bin 1 should now be turned on to discharge material for the calibration process. While this value is showing, turn on the Bin 1 motor, then turn it off when a reasonable amount of seed has been fed out. This is metered out at the MAN speed set above. For an Actuator unit, manually turn the ZeroMax smoothly. When you turn Bin 1 off, the display will show the actual number of revs of metering shaft to 2 decimal places of the Bin 1 drive. Weigh the amount of seed transferred in Kg. Divide the weight by this number of revs shown to get the actual weight per rev. e.g. if display shows 10.78 revs and the metered out grain weighs 6.47 Kg, then 6.47/10.78 = 0.600 Kg/Rev.

SET — 2nd press — 

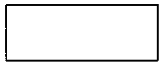
Enter the weight per rev just calculated.
So you enter 0.600 Kg/rev for the example.

SET — 3rd press — 

Locks in CAL. Enter Gear Ratio for Bin 1.

SET — 4th press — 

Locks in Gear Ratio. Enter increment/decrement valve for Rate change of Bin 1.

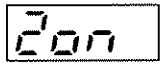
SET — 5th press — 

Locks in increment/decrement. Reverts back to display.

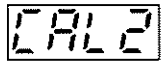
NOTE: For a more accurate resultant calibration, repeat the above calibration. Remember the CLEAR button must always be held in first to clear old values before any new valves can be entered.

5

Calibrating Bin 2

SET — 1st press — 

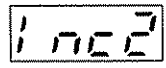
This indicates that Bin 2 should now be turned on to discharge material for the calibration process. While this value is showing, turn on the Bin 2 motor, then turn it off when a reasonable amount of seed has been fed out. This is metered out at the MAN speed set above. For an Actuator unit, manually turn the ZeroMax smoothly. When you turn Bin 2 off, the display will show the actual number of revs of metering shaft to 2 decimal places of the Bin 2 drive. Weigh the amount of seed transferred in Kg. Divide the weight by this number of revs shown to get the actual weight per rev. e.g. if display shows 10.78 revs and the metered out grain weighs 6.47 Kg, then 6.47/10.78 = 0.600 Kg/Rev.

SET — 2nd press — 

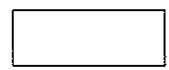
Enter the weight per rev just calculated.
So you enter 0.600 Kg/rev for the example.

SET — 3rd press — 

Locks in Cal. Enter Gear Ratio for Bin 2.

SET — 4th press — 

Locks in Gear Ratio. Enter increment/decrement value for rate change in Bin 2.

SET — 5th press — 

Locks in increment/decrement. Reverts back to display.

NOTE: For a more accurate calibration, it is now recommended to repeat the above calibration process for this bin to fine tune the CAL2 figure entered.

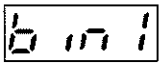
REPEAT THE SAME PROCEDURE TO CALIBRATE BIN 3

PROGRAMMING & SETTING VALUES

SET RATES

Press 7 or 8, then:

7 DEC. or 8 INC.

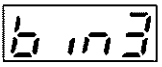
SET 1st press 

Press SET 1st time, displays Bin 1.
This is the Rate Bin 1 set. This should be the normal rate for that bin, even though by pressing 7 or 8 while working, this rate can be increased or decreased.

SET 2nd press 

Press SET 2nd time, displays Bin 2 and locks in Bin 1 entry.

This is the Rate Bin 2 set. This should be the normal rate for that bin, even though by pressing 7 or 8 while working, this rate can be increased or decreased.

SET 3rd press 

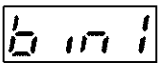
Press SET 3rd time, displays Bin 3 and locks in Bin 2 entry. This is the Rate Bin 3 set. This should be the normal rate for that bin.

SET 4th press

Press SET 4th time, display returns to RATE and locks in Bin 3 entry.

SET BIN WEIGHTS

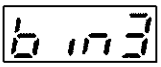
Press 9, then:

9 SET 1st press 

Press SET 1st time, displays Bin 1.
This is the Weight in Bin 1 when filled. This will run down to 0 when working. The Bin 1 toggle will flash when this bin is empty. When bin is refilled, select bin and hold in for 3 seconds until it refills bin in computer.

SET 2nd press 

Press SET 2nd time, displays Bin 2.
This is the Weight in Bin 2 when filled. This will run down to 0 when working. The Bin 2 toggle will flash when this bin is empty. When bin is refilled, select bin and hold in for 3 seconds until it refills bin in computer.

SET 3rd press 

Press SET 3rd time, displays Bin 3.
This is the Weight in Bin 3 when filled. This will run down to 0 when working. The Bin 3 toggle will flash when this bin is empty. When bin is refilled, select bin and hold in for 3 seconds until it refills bin in computer.

SET 4th press

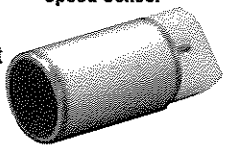
Press SET 4th time, display returns to RATE and locks in Bin 3 entry.

FITTING

SPEED SENSOR

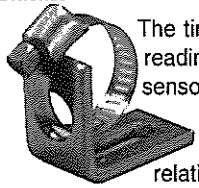
Hall Effect Sensor (Magnet Activation)

Speed Sensor

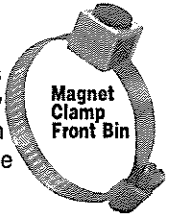


This supplied device is potted in an aluminium tube with a 3 pin socket at the end. The end opposite the socket is the active face, and senses when a magnet passes within 5mm of the face.

Fan Sensor Bracket



The time taken between each pulse is measured and is converted into a speed reading, taking into account the distance travelled for each rotation. The speed sensor is mounted on the brackets provided so that the magnet(s) on the hose clamps or wheel studs pass squarely in front of the face of the sensor at a maximum gap of 1/8inch. There must not be any movement of the sensor relative to the magnet caused by mounting the sensor on a sprung part of the chassis. For best accuracy the effective distance travelled over the ground for each sensor pulse should be not less than 2 inches and not more than 20 inches.



To get a small circumference, it is necessary to mount a number of magnets on a shaft or wheel. When mounting on wheel studs at equal spacing, simply silicone the magnets on the centre of the stud with the X facing out. When using hose clamp magnets, it is most important that the spacing between the magnets is the same to within at least 1/16inch, measure with a tape or wire.

Ground Speed Magnets

Uneven spacing will cause the ground speed to continually jump up and down and cause poor control. Mount the speed sensor on the brackets so that the magnets pass squarely across the face of the sensor. Protect the sensor and wiring from damage if necessary by welding or bolting a suitable plate over the sensor mount. Damage to the front face of the sensor will stop the speed readout and prevent the controller from working.

Magnet

Used with Hall Effect Sensors. The magnets used are pre-glued into holders on hose clamps or wheel studs. The clamps are tightened around the shaft of which the rotation is to be measured. Other make magnets must not be used as sensors will only trigger from a South pole.

Radar Speed Sensor

An optional Radar Interface cable allows direct connection to any existing Radar Speed Sensor on the tractor. Simply connect this wire to the signal wire from the Radar unit to enable Speed sensing for the Seed Rate Controller. This does not effect the tractor readings from the Radar unit. It is still recommended to use a standard KEE Speed Sensor for greater response. See DIP SWITCH SETTING to select Radar Sensor.

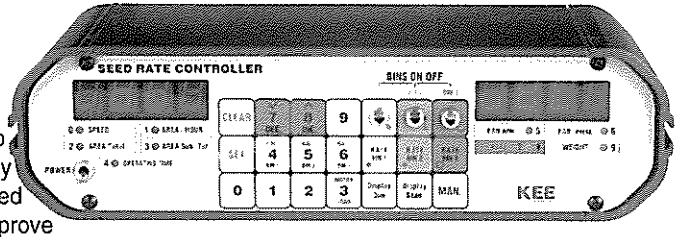
NOTE: If Radar used, Master Switch cannot be used at the same time.

Mounting On Tractor Wheel

Two or possibly three magnet hose clamps may be fitted around an axle on the tractor, and the sensor mounted on the brackets provided. A separate loom which leads to the speed sensor is available so that the normal breakaway may be used for the implement section without interfering with the ground speed sensor wiring.

This connects into the short cable extruding from the main box harness near the box. This is only recommended if front wheel is a non driven wheel. For 4WD tractors, it is recommended to fit magnets to studs on wheel of hopper.

CONTROL BOX



Fit the control box in the cab where the display is easily visible and preferably shielded from direct sunlight to improve visibility.

The brackets provided allow mounting either from the top or bottom, at a variety of angles.

Remember, in operation, the Computer is so advanced and automatic, it is not necessary for the operator to touch the unit at all except when he pulls into a field, starts, and pulls out of a field and stops, so it is not necessary to be in easy reach at all times. Be sure to leave enough space behind the box for the plug to attach. Remove the unit when not in use for a long period to reduce the risk of damage.

WIRING

Power

The computer is designed to be powered from a negative earth system. No attempt should be made to connect to a positive earth system until KEE is consulted or the warrantee will become void.

Connect the power wires in the front loom DIRECT TO BATTERY terminals.

FITTING

NOTE:

For a 2 Bin Airseeder, Tractor must be fitted with an alternator capable of 80 Amps load. Check your total load with all lights and AC on. (Change-over alternators are inexpensive if required.)

For a 3 Bin Airseeder, Tractor must be fitted with an alternator capable of 100 Amps load. Check your total load with all lights and AC on.

Unit WARRANTEE is VOID if power is not taken directly from the Battery Terminals without exception. Red (or White) with inline Fuse to positive, Black to negative. A correct automotive system will supply 13.8 volts when motor running. If not, regulator or alternator is faulty. If batteries are in poor condition, replace to avoid possible problems with Seed Rate Controller.

Unit will not operate below 12.5 volts. If diesel motor alternator is not working, battery voltage will eventually drop below 12.5 volts possible cause of computer to crash and requiring re-calibration. This only occurs when voltage very gradually reduces not when switched off. (The small red positive wire must remain live at all times). Power must be supplied to this line before the computer is turned on at its own switch, otherwise the microprocessor will not start correctly. Unit has a Memory Back-up which is not dependant on battery. This means all Totals and constants are retained if unit is removed from vehicle.

NOTE: Please keep 5 Amp Fuse to console in place. If by-passed the manufacturer bears no liability should any damage result to plant or property associated with an electrical fire. A 60 Amp fuse is also in the main motor feed line.

Front loom
Lead the loom from the Control Box to the back of the tractor. It is supplied with a break-away coupling. Care should be taken running loom from control box back, strapping where possible. The loom does not need to be cut or spliced, all excess cable should be strapped away to avoid vibration and wear.

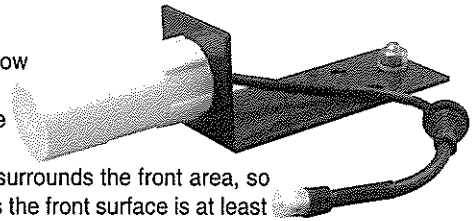
Implement loom (Tank towed behind Cultivator)
Continue from the break-away across the cultivator, strapping wires out of the way to avoid chafing or wear.

Tank loom extension.
This connects from the front of the tank to the Satellite Commander. Strap to hydraulic hoses allowing ample length.

Tank loom.
This is a standard Airseeder Computer tank harness and connects from the Satellite Commander to all airseeder sensors.

FITTING

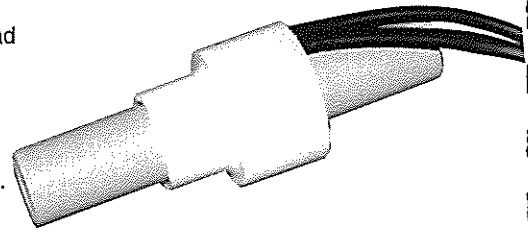
Bin sensors



Either one or two bin sensors may be fitted, for low bin level indication.
These are mounted in the grain bin on the brackets provided or through the bin walls in a suitable hole. The sensors detect when grain surrounds the front area, so they can be mounted in any position, as long as the front surface is at least 30mm clear of any other object.

Blocked Head Kit (Optional Extra)

This kit contains a sensor to be fitted on each secondary head in one of the final drop tubes.



This then detects the tube and the entire head for no flow or blockage.

The actual drop tubing must be cut 3 inches from the head outlet and fitted in line using hose clamps on the tubing.

Fitting:

Cut appropriate tube(s) near the head.
Insert sensor as far as possible, face wires down and inward. Sensor should now be reasonably rigid with the head.

Screw and push down tube on the bottom of the sensor.
Wire the sensors to each other with interconnecting hookups supplied. Start from one end of the bar and connect all up in series. Take the wire into one of the sensor wires, and the next wire out of the other sensor wire. After plugging all sensors together tape up all plugs with electrical tape to assist in preventing corrosion.

Be sure to connect main bar loom to one end sensor first before interconnecting all other sensors. Strap cable neatly and avoid areas of possible wear.

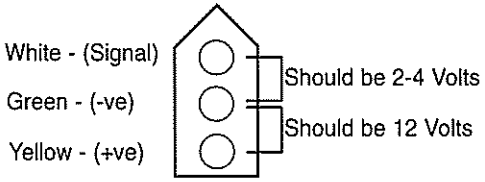
For tow behind tanks:

Run main cable down centre cultivator rearward to tank. Connect to tractor harness and run to rear of console and plug in. An interface hook-up is also required when running a DGPS also into this plug.

For tow between tanks:

Run main cable down center of cultivator rearward to tractor. Connect to supplied Tank harness and plug into Satellite Commander on Tank.

TROUBLE SHOOTING (continued)

PROBLEM	CAUSE / REMEDY
No display when unit turned on.	a: Flat battery (Low Voltage, must be greater than 12.5 volts) b: Blown fuse c: Power connection faulty - inspect and clean connections d: Monitor failure - ring KEE for advice and authorisation for return of the monitor for service.
No ground speed readout.	This will completely stop the automatic controller from working. You must have ground speed for the automatic controller to work. It is possible to still use the unit in MAN mode, driving consistently to this MAN speed. Check continuity of loom wires from control box to the sensor connection as diag. below using multi meter. 
Ground speed fluctuates.	Check the wheel speed sensor. If mounted on the front wheel of a 2 wheel drive tractor, there should be 2 or 3 magnet hose clamps at equal spacing. This spacing must be within 3mm to stop ground speed fluctuations. (Seed/fertiliser rate Fluctuations also will occur). If wheel stud magnets are fitted, check that one has not fallen off or been fitted around the wrong way. Use another magnet to check that all poles are the same
No Area or Area/hour readout.	(a) No ground speed, see above (b) Bins not turned on, Area is based on implement width, so Bins must be on to get an area readout. (c) Implement width set to zero, re-set implement width to correct value in metres. (Be sure decimal point is in correct position)

TROUBLE SHOOTING (continued)

PROBLEM	CAUSE / REMEDY
Weight (Volume Left) will not clock down.	This means the metering shaft on that Bin is not rotating. If shaft/motor connection broken, shaft & gear alarm will sound. If motor stalled, shaft alarm will sound. If no alarm present: (a) Bin Cal 1,2 or 3 set to 0 (b) Bins not turned on.
No readout on Seed/fertiliser rate. (Motor not running)	You must have both ground speed and Bin distribution shaft working to get a Seed/fertiliser rate readout. (a) No ground speed - see above (b) No Area/Hour - see above (c) No Weight Used - see above
No readout on Seed/Fertiliser rate and BIN CAL does not count up.(Motor running at full speed.)	If motor is rotating at full speed, re-check Bin Cal. If set correctly contact Dealer as internal motor sensing may be faulty.
Area errors.	1) If areas are clocking up higher or lower than known field sizes, but the Speed is correct, the machine width (AREA) programmed in is too wide or narrow. RULE OF THUMB: If Area clocked up is say 10% too High, reduce Width. by 10%. If Area clocked up is say 5% too Low, increase Width. by 5%. 2) If areas are clocking up higher or lower than known field sizes, in the same proportion to a Speed error, the circumference (Circ) programmed in is too high or low. RULE OF THUMB: If Area clocked up or speed is say 10% too High, reduce Circ. by 10%. If Area clocked up or speed is say 5% too Low, increase Circ. by 5%.

TROUBLE SHOOTING (continued)

PROBLEM	CAUSE / REMEDY
Shaft Alarms sound intermittantly at a certain specific speed.	This can be attributed to varying jamming loads on the motor and should be checked. Also a specific transition speed exists for the motors, and if heavy varying loads occur at this speed, intermittant shaft alarms may sound. Check the current on the motor and notice if it is varying up and down. If so, check Load and if it is less than 20% drive slightly faster or slower or change gearing on distribution shaft to increase load to at least 60%.
Shaft Alarms sound continuously above a certain specific speed.	Check that motors are connected to correct bins plugs on Satellite Commander. If these are crossed, the above situation will occur at a specific speed and higher.
Gear Alarm (Refer Specific Machine Operation)	If this cannot be cleared. (a) Check that Rate read out is present. If so re-program correct Gear ratio for that Bin. (b) If no Rate readout refer above.
noco on left display.	This message will only appear in left display if main cable from Control Console to Satellite Commander is disconnected or dammeged. Check all connecting plugs and locking rings. These locking rings are designed to break if excesive strain is placed on the connection to prevent wire damage. If broken, contact KEE for replacement. Break off old ring and simply clip on new ring over plug. Use cable ties criss-crossed to securely hold connection together if waiting for replacement rings.

SPECIFICATIONS

CONTROL BOX

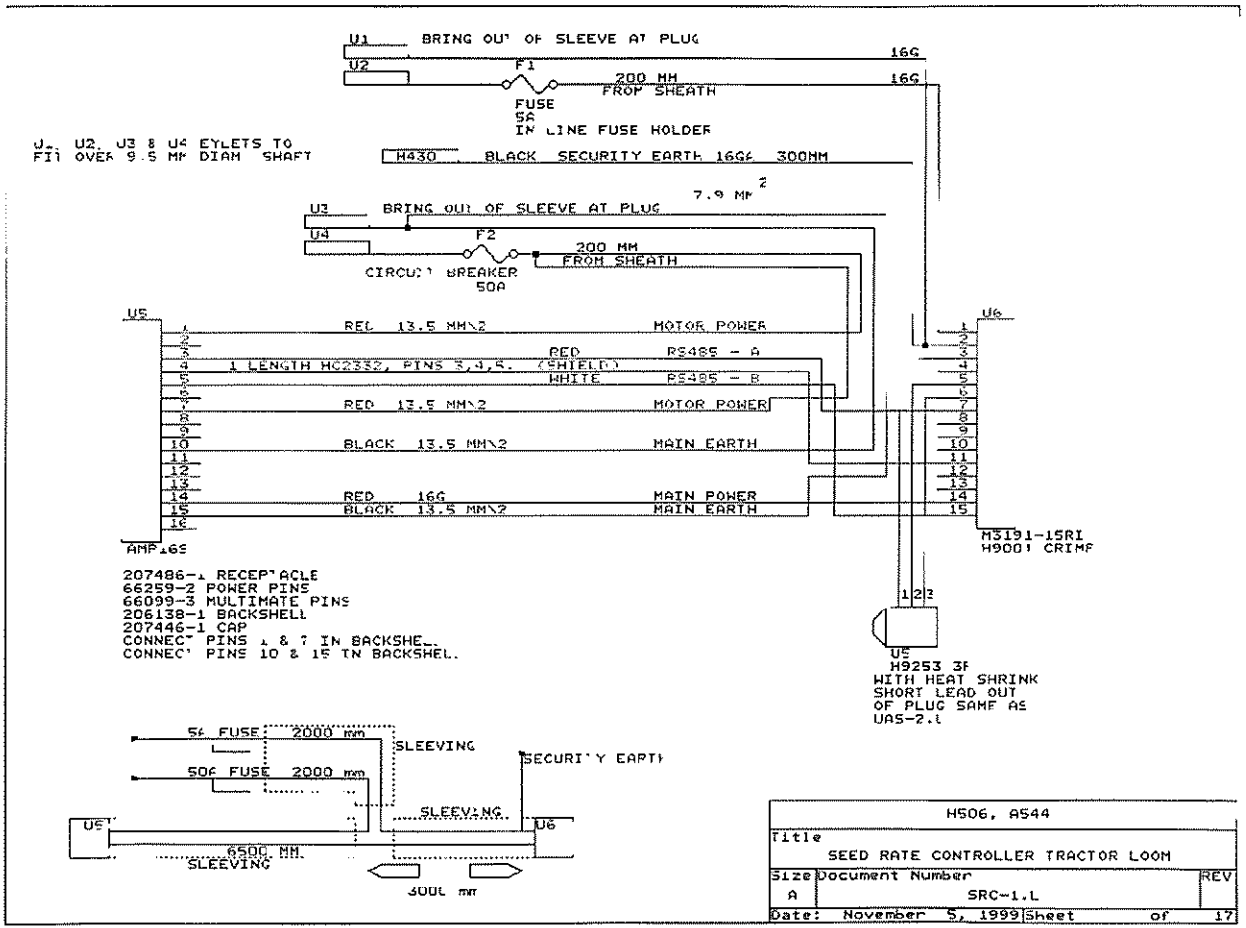
Supply voltage:	13 -16 volts negative earth.

No attempt should be made to connect the system to a positive earth vehicle. Damage will result and Warranty will become void.

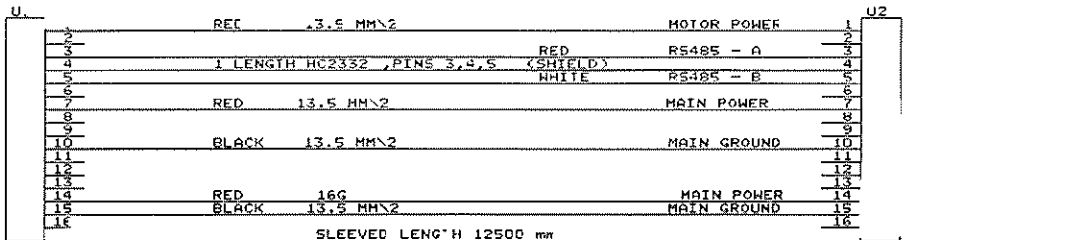
Supply current: Control Box	0.9 amps approx.
Maximum Motor: supply current	20 amps each (60amps total)

SENSORS

Ground speed sensor:	Hall effect type
Shaft Sensors:	Hall effect type
Supply voltage :	Supply - 12 volts from control box
Supply current :	less than 100 ma
Signal voltage :	4 - 5 volts sensor inactive < 1 volt sensor activated by magnet
Fan pressure sensor:	Solid state aircraft altimeter type. Max error 1%.
Bin level sensor:	Solid state capacitive type. Triggered on flat end. Sensativity adjustable for light material eg. Urea.
Blocked head sensor:	4-5 volts in alarm state, no material flow. <1 volt with material flow.

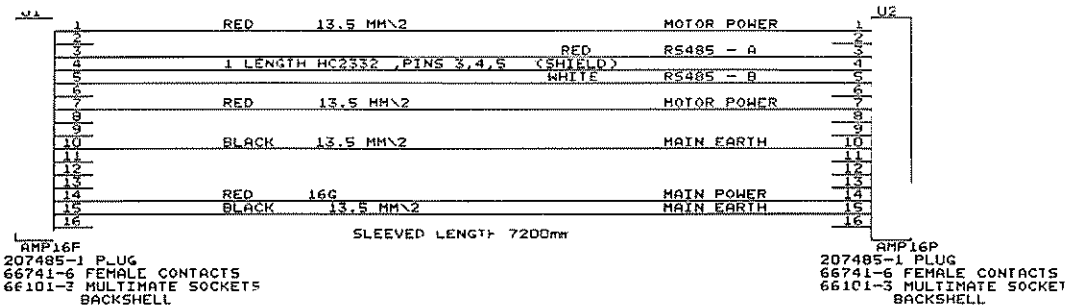


H506, A544		
Title: SEED RATE CONTROLLER TRACTOR LOOM		
Size: A	Document Number: SRC-1.L	REV:
Date: November 5, 1999	Sheet of 17	



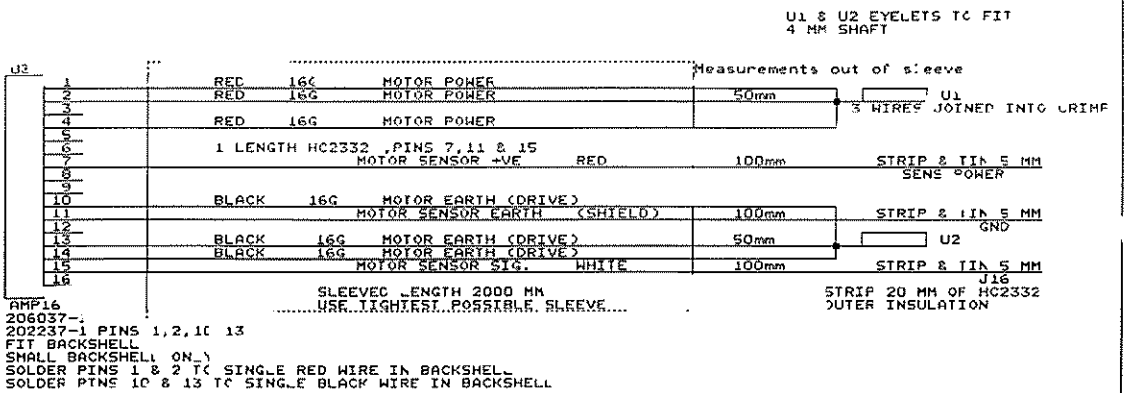
CONNECT PINS 1 & 7 IN BOTH BACKSHELLS
CONNECT PINS 10 & 15 IN BOTH BACKSHELLS

H508, A546		
Title: SEED RATE CONTROLLER IMP. EXT. 12.5M		
Size: A	Document Number: SRC-2.L	REV: H
Date: September 16, 1999	Sheet 3 of 17	

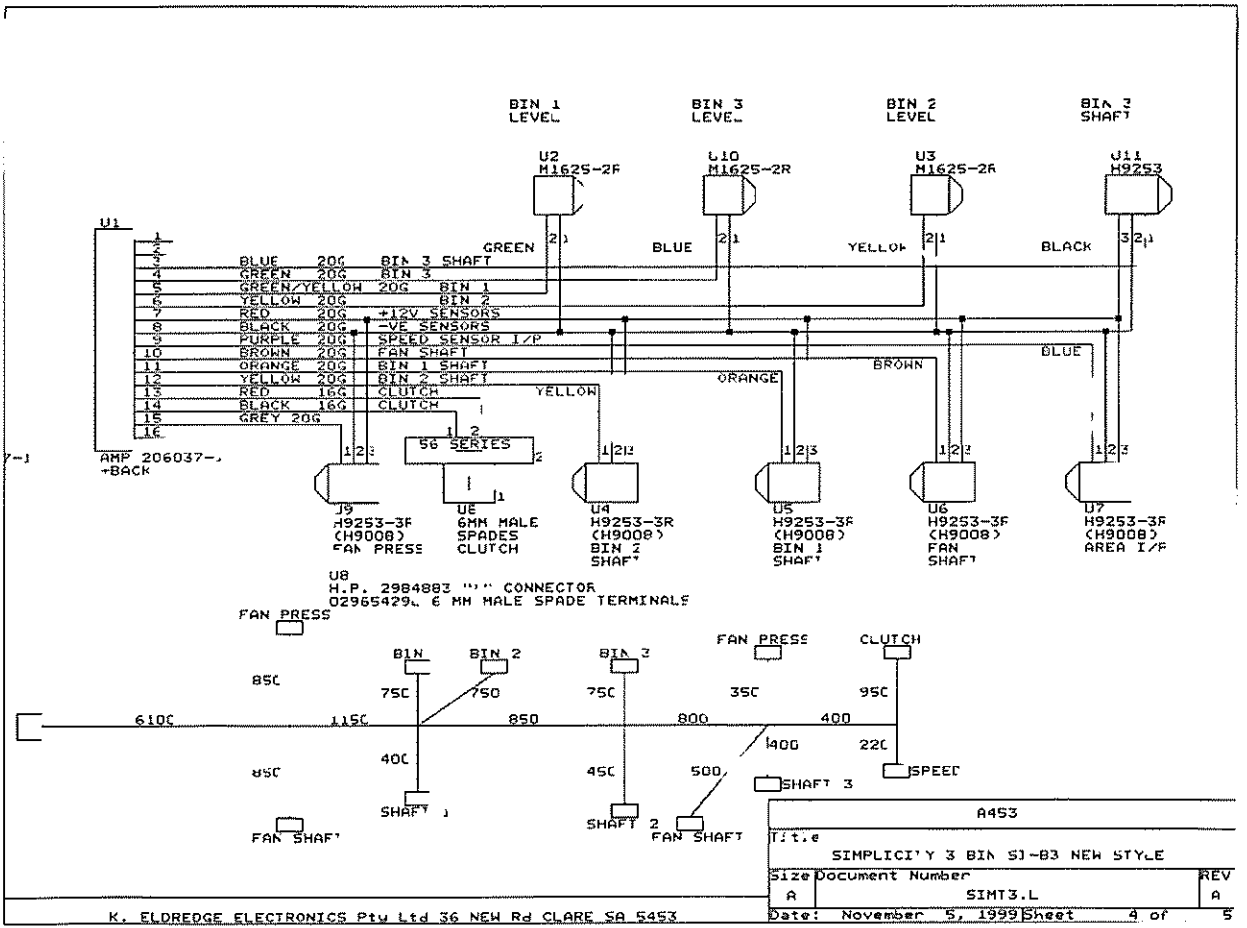


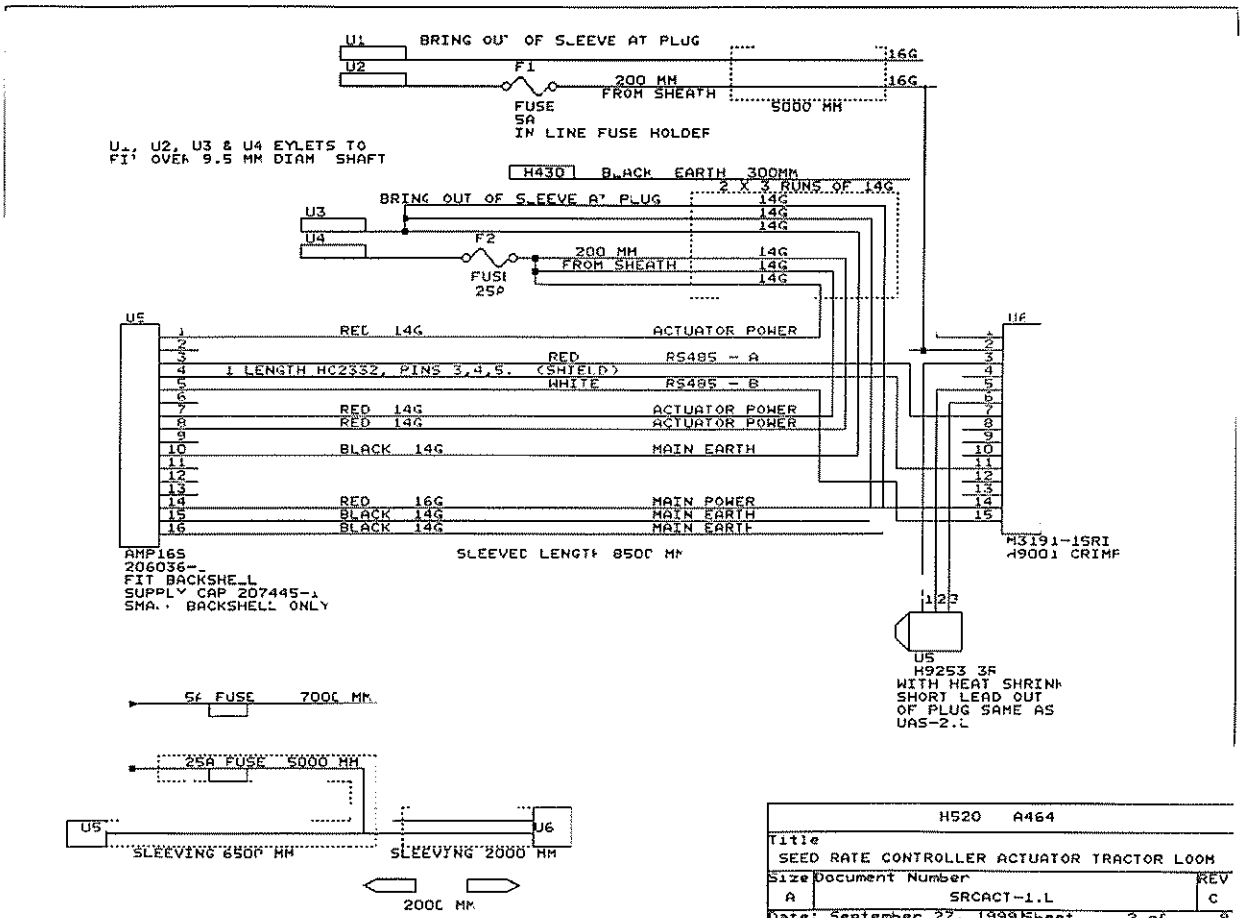
CONNECT PINS 1 & IN BOTH BACKSHELLS
CONNECT PINS 10 & 15 IN BOTH BACKSHELLS

H507, A545		
Title: SEED RATE CONTROLLER TANK EXT. 7.2M		
Size: A	Document Number: SRC-3.L	REV: K
Date: September 16, 1999	Sheet: 4 of	17

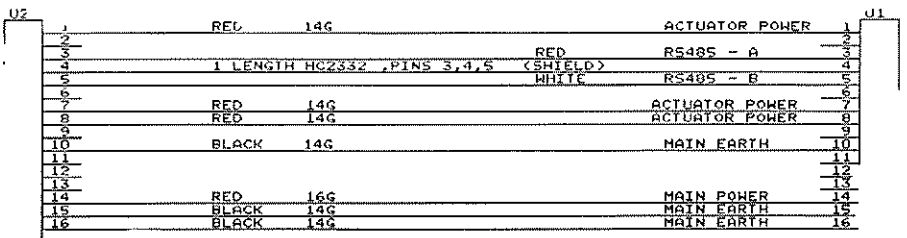


H510		
Title: SEED RATE CONTROLLER MOTOR LOOM		
Size: A	Document Number: SRC-4.L	REV: F
Date: June 18, 1998	Sheet 5 of 17	


BIN 1 LEVEL
BIN 3 LEVEL
BIN 2 LEVEL
BIN 3 SHAFT
U2 M1625-2R
U10 M1625-2R
U3 M1625-2R
U11 M9253
U1
BLUE 20G BIN 3 SHAFT
GREEN 20G BIN 3
GREEN/YELLOW 20G BIN 1
YELLOW 20G BIN 2
RED 20G +12V SENSORS
BLACK 20G -VE SENSORS
PURPLE 20G SPEED SENSOR I/P
BROWN 20G FAN SHAFT
ORANGE 20G BIN 1 SHAFT
YELLOW 20G BIN 2 SHAFT
RED 16G CLUTCH
BLACK 16G CLUTCH
GREY 20G
AMP 206037-1 +BACK
58 SERIES
J9 M9253-3R (M9008) FAN PRESS
U8 6MM MALE SPADES CLUTCH
U4 M9253-3R (M9008) BIN 2 SHAFT
U5 M9253-3R (M9008) BIN 1 SHAFT
U6 M9253-3R (M9008) FAN SHAFT
U7 M9253-3R (M9008) AREA I/P
U8
H.P. 2984883 "I" CONNECTOR
02965429 6 MM MALE SPADE TERMINALS
FAN PRESS
BIN 1
BIN 2
BIN 3
FAN PRESS
CLUTCH
SPEED
SHAFT 1
SHAFT 2
SHAFT 3
FAN SHAFT
FAN SHAFT
A453
SIMPLICITY 3 BIN SI-83 NEW STYLE
SIMT3.L
K. ELDREDGE ELECTRONICS Pty Ltd 36 NEW Rd CLARE SA 5453
November 5, 1999
4 of 5



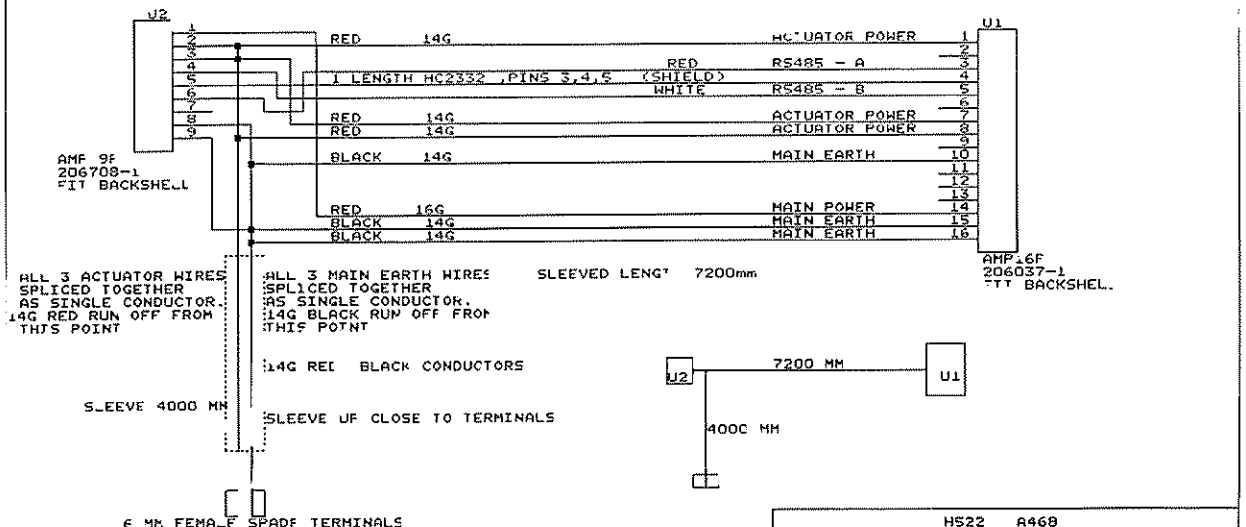
H520 A464		
Title: SEED RATE CONTROLLER ACTUATOR TRACTOR LOOM		
Size: A	Document Number: SRCACT-1.L	REV: C
Date: September 27, 1999	Sheet 2 of 9	



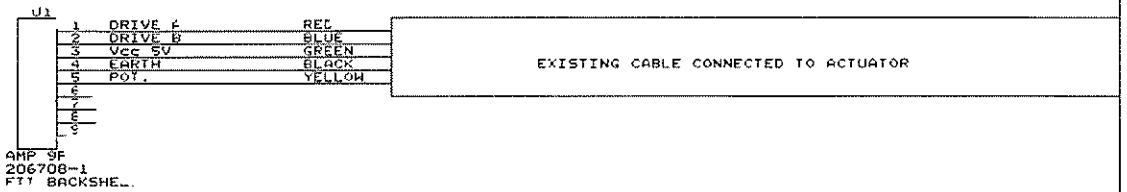
SLEEVED LENGTH 1250C mm

AMP16S
206036-1
FIT BACKSHELL
SUPPLY CAP 207445-1
SMALL BACKSHELL ONLY

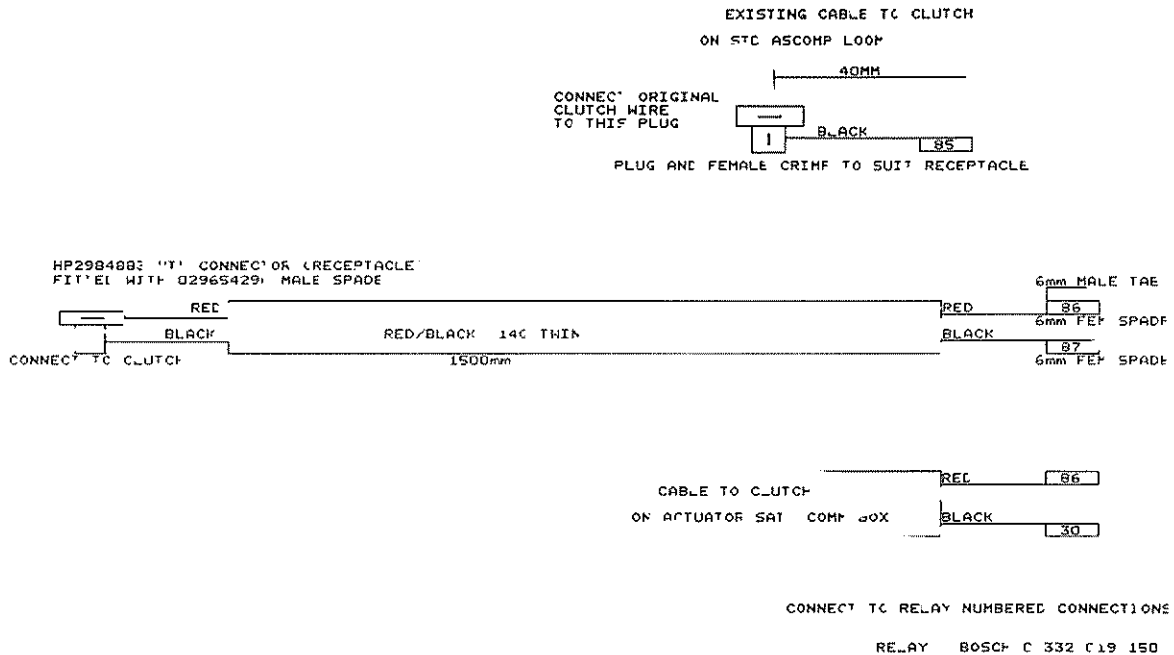
H521 A467		
Title: SEED RATE CONTROLLER ACTUATOR IMP. EXT. 12.5		
Size: A	Document Number: SRCACT-2.L	REV: A
Date: September 27, 1999	Sheet 3 of 9	



H522 A468		
Title: SEED RATE CONTROLLER ACTUATOR TANK EXT. 7.2M		
Size: A	Document Number: SRCACT-3.L	REV: A
Date: September 27, 1999	Sheet 4 of 9	



Title: SEED RATE CONTROLLER ACTUATOR LOOM		
Size: A	Document Number: SRCACT-4.L	REV: A
Date: November 21, 1998	Sheet 5 of 9	



H240 A669		
Title: SRCACT RELAY HOOKUP		
Size: A	Document Number: SRCACT-7.L	REV: C
Date: September 27, 1999	Sheet 9 of 9	

SPECIFIC MACHINE OPERATION

SIMPLICITY SEED RATE CONTROLLER GEAR RATIOS

ELECTRIC MOTOR DRIVE:

The standard fitment from the factory with Electric Motor Drive will be a 21 Tooth on the Adjutator driving a 21 Tooth on the metering roller. This is the STANDARD range for general cereals and low to medium rates of fertiliser giving a total GEAR ratio of 30:1.

All sprocket configurations are as follows (30:1 Motors): 4 pulse

- **14 Tooth driving a 28 Tooth**, GEAR ratio of **60:1** 30:1
  (Used for Canola in conjuction with blank off plates on 2 rollers and for other very low rates.)
- **14 Tooth driving a 21 Tooth**, GEAR ratio of **45:1** 22.5:1
  (Used for low rates of all grain and fertilizer)
- **21 Tooth driving a 21 Tooth**, GEAR ratio of **30:1** 15:1
  (Used for medium rates of all grain and fertilizer)
- **21 Tooth driving a 14 Tooth**, GEAR ratio of **20:1** 10:1
  (Used for high rates of all grain and fertilizer)
- **28 Tooth driving a 14 Tooth**, GEAR ratio of **15:1** 7.5:1
  (Used for very high rates of all grain and fertilizer)

For high rates of fertiliser, change sprockets so MOTOR LOAD is between 75% and 95%. For all other operations, MOTOR LOAD can operate nomally less than 80% down to pulsations no longer than 1/2 a second apart. (Sprockets can generally be selected to prevent pulsations but this is a normal accurate operation)

Don't just monitor...

Take Control!

with

KEE

PRECISION FARMING CONTROLS