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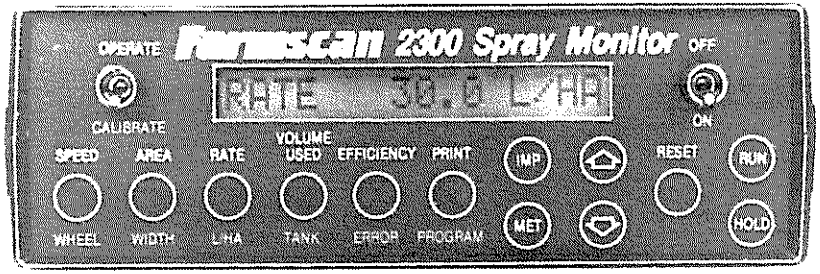
FARMSCAN

2300 SPRAY MONITOR



INSTALLATION AND OPERATION INSTRUCTIONS

Farmscan
Electronics for Agriculture.

PART No AM-209

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PARTS LIST

2300 SPRAY MONITOR KIT

REF	PART NO	DESCRIPTION	QTY
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3	AH-860	FINGERSCREWS	2
4	AC-101	5M POWER CABLE	1
5	AH-408	UNIVERSAL HARDWARE PACK	1
6	AP-704	12 PIN INPUT PLUG (2300)	1
7	AA-131	WHEEL SENSOR (INC. 8M CABLE)	1
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9	AH-399	WHEEL SENSOR MOUNTING BRACKET	1
10	AA-120	90 L/MIN FLOW SENSOR	1
11	AC-705	8M FLOW SENSOR CABLE	1
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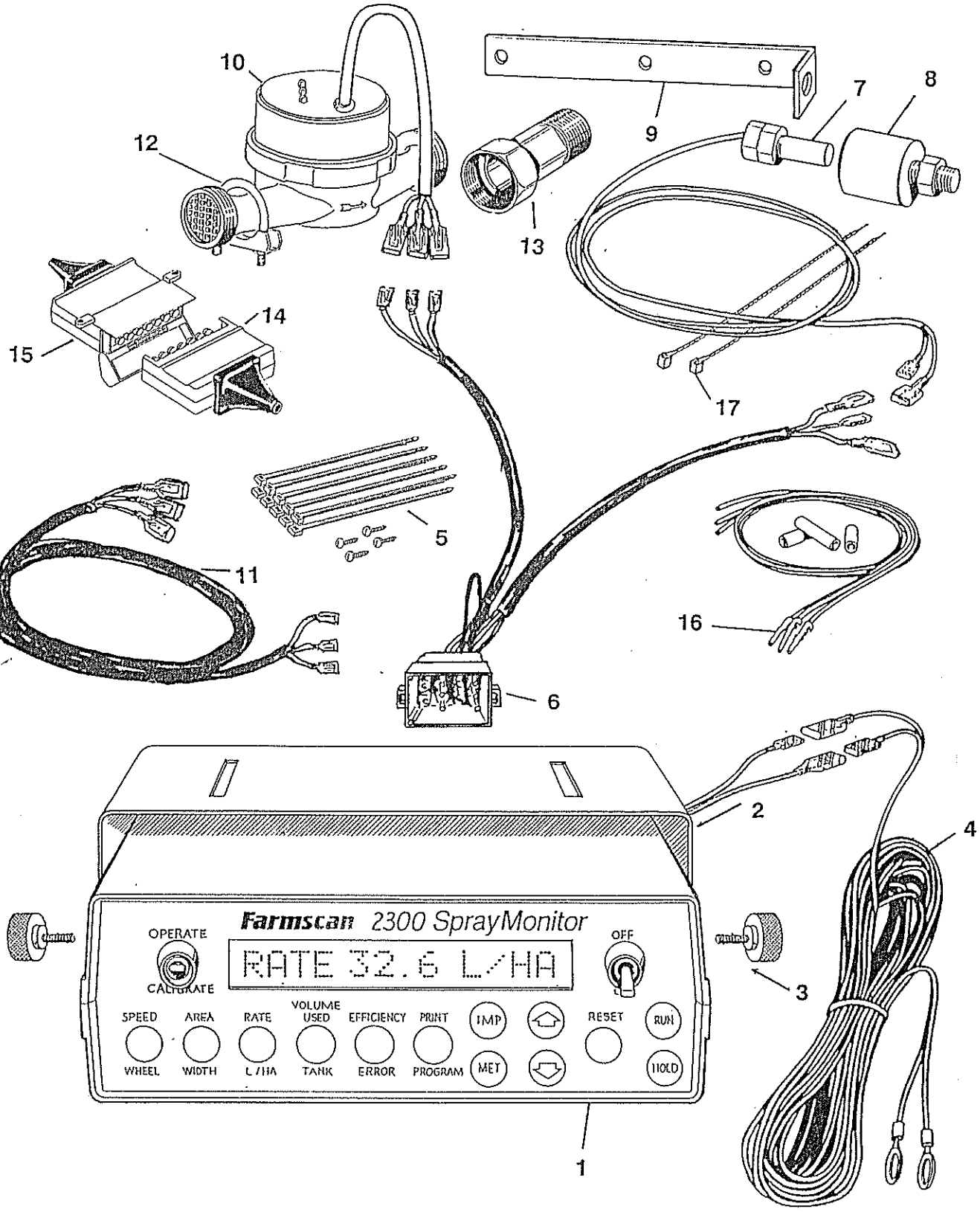
OPTIONS

1009	TAILSHAFT SENSOR KIT
2005	ELECTRONIC SPEED SENSOR KIT
2006	SPEEDO CABLE SENSOR KIT
2040	PRINTER KIT

PARTS PICTORIAL



2300 SPRAY MONITOR KIT

1.0 GENERAL OUTLINE

The FARMSCAN 2300 SPRAY MONITOR keeps check that chemical is applied at the right rate. An audible alarm warns the operator if the desired rate is not being maintained within a pre-set percentage.

Instant information, available for selection on-the-go, keeps the operator informed of GROUND SPEED, TOTAL & TRIP AREA, LITRES PER HECTARE, LITRES PER MINUTE AND TANK USAGE.

An EFFICIENCY readout tells the operator at any time during the day the percentage of productive spraying time achieved as against total time spent in the paddock.

An optional 2040 PRINTER KIT is available to print out in hard copy stored information of up to 9 separate Trip Areas.

Your Spray Monitor may also be used for monitoring misting operations, however special alterations must be made.

For further information contact your local Farmscan Dealer or the Computronics on (09) 221 2121.

PLEASE READ INSTALLATION AND OPERATION INSTRUCTIONS THOROUGHLY BEFORE PROCEEDING TO INSTALL.

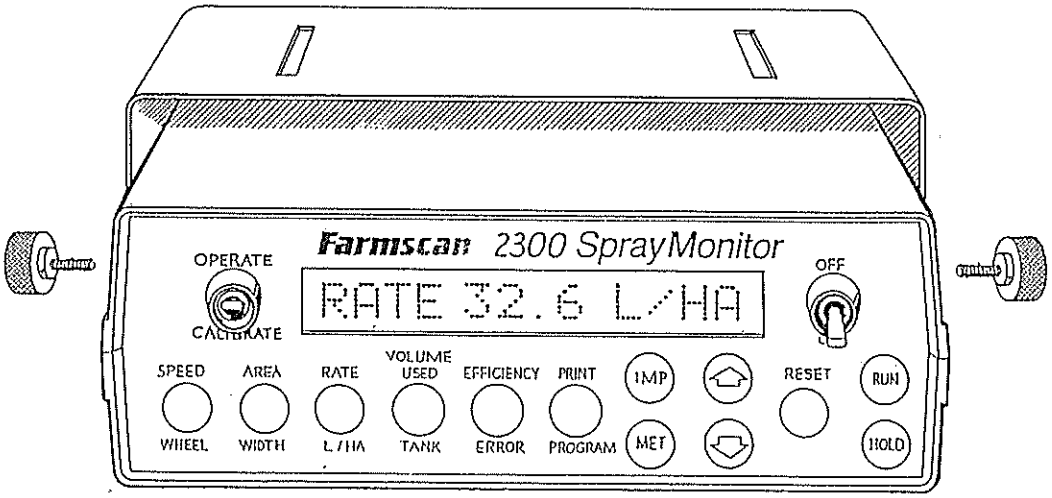
2.0 INSTALLATION

2.1 MONITOR INSTALLATION

Mount Monitor in cab for ease of viewing, avoiding direct sunlight on the display (maximum operating temperature — 70 degrees celcius).

DO NOT mount Monitor directly above or beneath high-powered radio transceivers.

Install the MONITOR MOUNTING BRACKET (2) in a convenient location using the Self-tapping Screws provided in the UNIVERSAL HARDWARE PACK (5). Secure the Monitor to the Monitor Mounting Bracket using the FINGERSCREWS (3) provided. Use height adjustment holes on the Monitor Mounting Bracket to achieve the best possible viewing angle.



2.2 POWER CONNECTION

Run the 5M POWER CABLE (4) directly to the 12 volt battery terminals. It is ESSENTIAL NOT to run the Power Cable in close proximity to or alongside radio antenna lead.

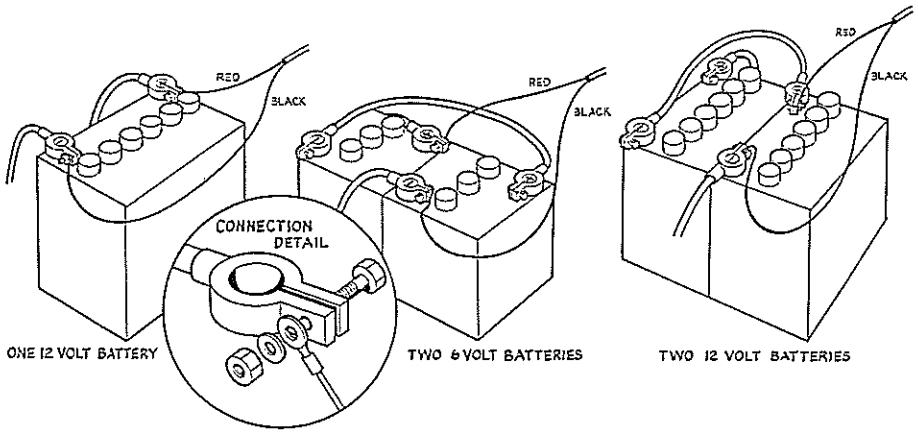
DO NOT connect power to a live point underneath dash, nor to the tractor starter solenoid, and do not connect negative (-) to chassis.

IMPORTANT: It is essential that battery connections are clean and tight. Use Cable Ties to ensure Power Cable is kept away from hot or moving parts.

It is also important not to supply any other electronic instrument using same Power Cable, otherwise electrical interference may result.

— TYPICAL BATTERY HOOKUPS —

ATTACH BLACK WIRE DIRECTLY TO THE NEGATIVE TERMINAL (-) OF THE BATTERY.
ATTACH THE RED WIRE TO THE POSITIVE TERMINAL (+).



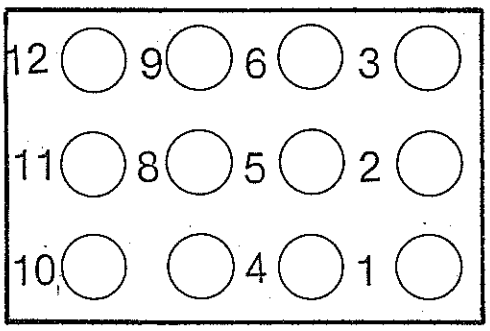
WARNING: DISCONNECT POWER LEADS FROM BATTERY WHEN ARC WELDING.

2.3 INPUT PLUG

All of the Sensor connections are made through the 12 Pin Input Plug located at the rear of the Spray Monitor.

The legend imprinted on the back panel explains the function of each wire. Taking note of the guide notches inside the plug and socket, push 12 PIN INPUT PLUG (6) into socket of Spray Monitor. This will enable the connection of the Flow Sensor, Wheel Sensor/Speedo Cable Sensor and Solenoid Connecting Wires.

PIN No.	FUNCTION
1.	Left Solenoid
2.	Centre Solenoid
3.	Right Solenoid
4.	Flow Sensor Power (Brown)
5.	Flow Sensor Signal (White)
6.	Flow Sensor Ground (Black)
7.	Unused
8.	Solenoid Link) Cut Link when
9.	Solenoid Link) using solenoids
10.	Wheel Sensor Signal (Brown)
11.	Wheel Sensor Ground (Blue)
12.	Speedo Cable Sensor Power (Green/Yellow)



2.4 WHEEL SENSOR INSTALLATION

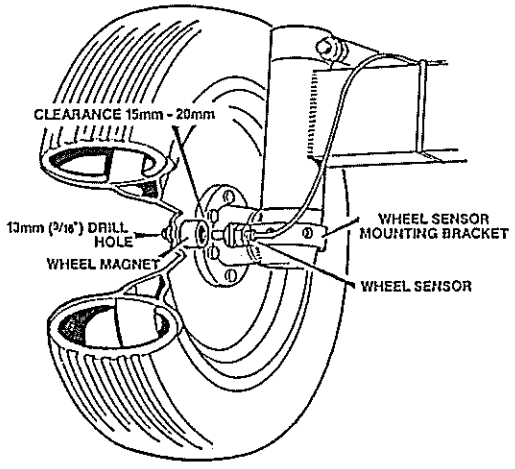
The WHEEL SENSOR KIT can be fitted to any undriven ground wheel. If the Wheel Sensor is fitted to a driven wheel, inaccuracy of speed and area readouts will result if wheelslip occurs.

In the case of 4WD tractors or front-wheel assist tractors, the Wheel Sensor must be fitted to an undriven implement wheel.

INSTALLATION: The Wheel Sensor Kit consists of a Wheel Magnet and Nut which is mounted onto the ground wheel and a magnetic Wheel Sensor.

When positioning the Wheel Sensor and Magnet it is essential that the Magnet passes within 15-20mm of the Wheel Sensor when the wheel rotates. It is most important that the Wheel Magnet and Wheel Sensor face end to end, as shown below.

WHEEL SENSOR MOUNTING



If the WHEEL SENSOR (7) and WHEEL MAGNET AND NUT (8) are mounted onto a steered wheel, the Wheel Sensor must move on the same axis as the wheel, in order to maintain equal clearance with the Magnet while steering.

The Wheel Magnet should be located as near to the centre of the hub as possible for maximum ground clearance. If unable to bolt Magnet through hub, it can be screwed into 1/2" UNF tapped hole or screwed into nut welded onto hub.

The Wheel Sensor should be located behind the axle or wheel strut. The aluminium WHEEL SENSOR MOUNTING BRACKET (9) can be cut or bent to achieve correct alignment with the Magnet. The Self-tapping Screws supplied or bolts should be used to secure the Wheel Sensor.

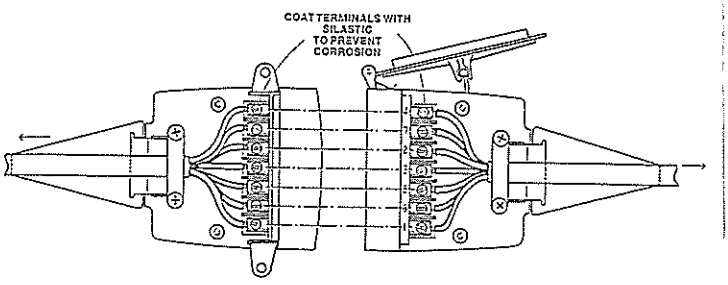
WIRING WHEEL SENSOR : The Brown and Blue Wheel Sensor wires must be connected directly to the corresponding brown and blue leads protruding from pins 10 and 11 of the 12 Pin Input Plug.

If the Wheel Sensor is fitted to a trailed Boomspray, run the cable to the rear of the towing vehicle and cut. Strip wires back and fit into 7 pin Breakaway Socket (diagram below), then mount onto the towing vehicle. When mounting the Brylite Socket it is important to face it toward the Boomspray so that if uncoupling occurs, the breakaway action works cleanly.

The cable should be secured away from any hot or moving parts using Cable Ties supplied. Making sure to allow enough cable for turning, fit the 7 Pin Brylite Plug onto the Boomspray side of the cable.

The Brylite Plug and Socket are numbered on the inside and the wiring sequence should go as follows:

Pin No 1	Brown	Flow Sensor Power
Pin No 6	White	Flow Sensor Signal
Pin No 5	Black	Flow Sensor Ground
Pin No 3	Blue	Wheel Sensor Signal
Pin No 2	Brown	Wheel Sensor Ground
Pin No 4	Unused	
Pin No 7	Unused	



2.5 FLOW SENSOR INSTALLATION

The maximum rated capacity of your FLOW SENSOR (10) is 90 litres per minute. Flow rates in excess of 90 litres per minute will result in spray errors.

To calculate your maximum possible flowrate use the following formula:

$$\frac{\text{MAX L/HA x MAX KPH x BOOM WIDTH (M)}}{600} = \text{LITRES PER MINUTE}$$

Fit the Flow Sensor into the main delivery line to the boom at a point before any solenoid valves or other means of isolating boom sections, but after any return lines back to the tank.

Mount the Flow Sensor horizontally to a solid surface using 'U' CLAMPS (12) provided and ensure Flow direction arrows on Flow Sensor are pointing with the direction of flow.

WIRING FLOW SENSOR : Connect 8m FLOW SENSOR CABLE (11) to the black, brown and white wires protruding from pins 4, 5 and 6 of the 12 Pin Input Plug.

If the Flow Sensor is fitted to a trailed Boomspray, run the Flow Sensor Cable to the rear of the towing vehicle and cut. Fit into pins 1, 6 and 5 of the 7 Pin Brylite Socket, and then Brylite Plug as described in section 2.4 of this manual.

Run cable down to Flow Sensor and connect to corresponding wires, protruding from the top of the Flow Sensor. Use the Cable Ties to keep cable away from hot or moving parts.

IMPORTANT: Under no circumstances must Brown Wire (+12 volts) be crossed or shorted together with White or Black wires.

2.6 SOLENOID VALVE CONNECTION

The Spray Monitor does not directly control electric solenoid valves. If an independent solenoid switching unit is fitted to the sprayer the Spray Monitor can detect when a boom section is shutdown, then adjust the width calibration so that the AREA readouts are corrected for the remaining width of boom still operating.

The Spray Monitor is able to monitor which boom sections are operating by wires connected between each solenoid controlling switch and the Spray Monitor.

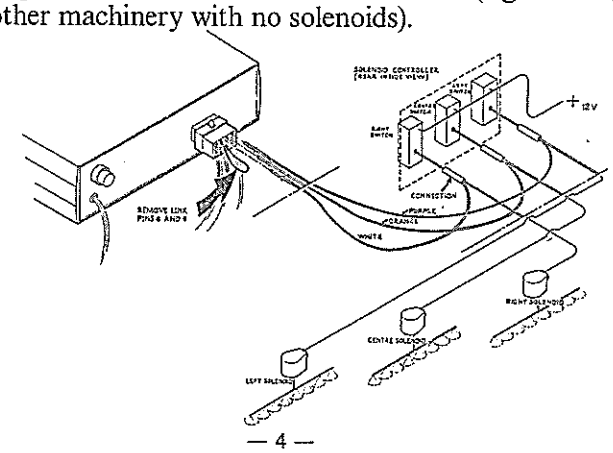
Three SOLENOID CONNECTING WIRES (16) supplied with the Spray Monitor Kit have pins fitted to one end which push into pin positions 1, 2 and 3 of the 12 Pin Input Plug.

PIN 1	PURPLE WIRE	SOLENOID 1	LEFT BOOM SECTION
PIN 2	ORANGE WIRE	SOLENOID 2	CENTRE BOOM SECTION
PIN 3	WHITE WIRE	SOLENOID 3	RIGHT BOOM SECTION

Each Solenoid Connection Wire must be joined to the side of each respective switch that becomes 'LIVE' when the solenoid is open (boom operating). Simply cut the wire from the 'LIVE' side of each switch and re- join together with each respective Solenoid Connecting Wire using joiners supplied. Preferably, the wires should be soldered directly to each switch terminal.

Even if only one or two solenoid valves are used, it is advisable to connect all three wires to those independent switches for the purpose of calibration.

IMPORTANT: Between pins 8 & 9 of the 12 Pin Input Plug is a short blue link wire which must be removed to signify that solenoid valves are connected, otherwise calibration of independent widths is not possible. Link wire must be replaced when solenoids are not used (e.g. if using the Spray Monitor for Speed and Area readouts on other machinery with no solenoids).



3.0 CALIBRATION PROCEDURE

3.1 GENERAL OUTLINE

All of the calibration functions on your Farmscan 2300 Spray Monitor are written in "Red" on the Front Panel.

Calibration factors are the values upon which your 2300 Spray Monitor bases all of its calculations. When entering a value, switch the 'OPERATE/CALIBRATE' switch to 'CALIBRATE' and select the appropriate function.

The following functions may be selected:

* Wheel Circumference (Wheel)
* Boom/Boom Section Width (Width)
* Rate/Flow Sensor Selection (L/HA)
* Tank Volume/Low Tank Alarm Reset (Tank)
* Acceptable Error Percentage (Error)
* Printer Information (Data)

After selecting the desired calibration function, calibration factors are simply entered by pressing the UP and DOWN arrows to increase or decrease the number displayed. Repeated pressing of the UP and DOWN arrows will result in one increment changes, while holding the button down will alter the numbers quickly.

IMPORTANT: The 2300 Spray Monitor must be calibrated in Metric Units Only (e.g. wheel in metres, width in metres).

Once your Spray Monitor has been calibrated, select the 'OPERATE' position and you may select on-the-go information in either IMPERIAL or METRIC Units.

3.2 WHEEL CALIBRATION

The factor is defined as the Distance of Forward Travel between pulses from the Wheel Sensor.

Wheel Calibration procedure will only have to be undertaken once unless ground conditions differ considerably. Best results are achieved by carrying out the calibration procedure under normal ground conditions.

If the Wheel Sensor is fixed to the Boomspray Wheel, when calibrating half fill tank to establish average tyre loading.

Mark sensed ground wheel in bottom centre position and peg ground in corresponding position.

Drive forward in a straight line for exactly 10 wheel rotations and stop on tyre mark.

Measure the distance covered by 10 wheel rotations and then divide distance by 10 to establish the true circumference of one wheel rotation. This will give you the true wheel travel measurement.

Switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE' and push the button marked 'WHEEL'. Enter the wheel circumference figure using the UP and DOWN arrows.

EXAMPLE:	Distance covered in 10 wheel rotations	=	25.6M
	Divide distance covered by 10	=	2.56m
	Enter Wheel Calibration	=	2.560

Switch 'OPERATE/CALIBRATE' switch back to 'OPERATE'.

3.3 WIDTH CALIBRATION

This factor is defined as the Effective Working Width of the Boomspray.

To calibrate, switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'. If no solenoids are used, ensure 12 Pin Input Plug is connected then simply push button marked WIDTH and enter the effective working width of the Boomspray using the UP and DOWN arrows.

If solenoids are used, ensure they are connected as described in Section 2.6

Press WIDTH button, switch master solenoid switch 'ON' and turn Left solenoid 'ON', leaving centre and right solenoids switched 'OFF'. Enter the Width of the Left Boom Section using UP and DOWN arrows (e.g. If width is 8.00M; displays as 'WIDTH 1 8.00M').

Switch left solenoid 'OFF' and switch centre solenoid 'ON'. Enter Width of Centre Boom Section (e.g. If width is 4.00M; displays as 'WIDTH 2 4.00M').

Switch centre solenoid 'OFF' and switch Right solenoid 'ON'. Enter Width of Right Boom Section (e.g. If width is 8.00M; displays as 'WIDTH 3 8.00M').

After entering all three widths, turn each solenoid 'ON' and the entered widths of each section should add up to display Total Width of the Boom.

Switch 'OPERATE/CALIBRATE' switch back to 'OPERATE'. It is important to note that your 2300 Spray Monitor will not recognise Boom Sections shutdown by manual valves, hence the rate readout will not be correct unless the Width Calibration is altered accordingly.

3.4 RATE CALIBRATION

Rate Calibration is the required application rate expressed in Litres Per Hectare.

To Calibrate, switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'.

Press button marked 'L/HA' (Litres per Hectare) and use the UP and DOWN arrows to enter in the desired application rate (e.g. 40.0 Litres per Hectare).

Once entered, return 'OPERATE/CALIBRATE' switch to 'OPERATE'.

3.5 TANK CALIBRATION

By entering in the Total Volume of chemical held in your tank when full, your 2300 Spray Monitor will be able to calculate Volume Used from your tank and Volume Left in the tank.

When there is 100 litres left in the tank, the Spray Monitor will sound a 5 second audible alarm and display 'TANK 100 L LEFT'.

To calibrate, switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'. Press button marked TANK and alter figure using the UP and DOWN arrows (e.g. full tank 2250 litres, enter volume so display reads 'TANK 2250 LIT'). In this case the Low Tank Alarm will sound after 2150 litres have been sprayed.

If the tank is only half filled with material, you must re-enter the Tank Volume to change the Low Tank Alarm point (e.g. Half tank 1125 litres, enter volume so display reads 'TANK 1125 LIT'). In this case the Low Tank Alarm will sound after 1025 litres have been sprayed.

When entered, switch 'OPERATE/CALIBRATE' switch to 'OPERATE'.

3.6 ERROR CALIBRATION

Error calibration allows you to enter a percentage figure which is the amount of variation from the intended rate that you will accept before the rate error alarm sounds.

For example, if your intended rate is set to 50 L/HA and your error calibration is set to 10%, then the actual application rate may vary between 45-55 L/HA before the rate error alarm will sound.

In the case of fixed pressure sprayers, your ability to maintain accurate speed will determine how low the error percentage can be set, without the warning alarm sounding to often.

Switch the 'OPERATE/CALIBRATE' switch to 'CALIBRATE' and press key marked ERROR. Use the UP and DOWN arrows to enter in your accepted percentage (e.g. Error 10%).

3.7 CLOCK CALIBRATION

Your 2300 Spray Monitor has an internal clock and calendar which has been factory preset in Perth.

The clock will run for approximately 5 years on the internal battery back-up so you only need to re-adjust the clock to local time if necessary.

Switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE' and select ERROR key.

Press the Reset key repeatedly to cycle through the year, month, date and day selections. Stop at the hour selection and set in the correct hour using the UP and DOWN arrows. Press RESET button again to alter minutes — use UP and DOWN arrows.

Press RESET button again to complete the clock calibration, then press 'RUN' key to start the clock.

Return 'OPERATE/CALIBRATE' switch to 'OPERATE'.

3.8 PROGRAM CALIBRATION

Program selection is only applicable when a 2040 Printer Kit is connected.

This function enables the operator to obtain a separate printout of the nine individual Trip Memories and their characteristics such as:

Function: Trip Area Number

- Paddock Number (Paddock NR)
- Price ($/HA)
- Temperature (Degrees Celsius)
- Humidity (%)
- Windspeed (kph)
- Chemical 1 Code
- Chemical 1 (Litres per Hectare)
- Chemical 2 Code
- Chemical 2 (Litres per Hectare)
- Chemical 3 Code
- Chemical 3 (Litres per Hectare)

All of the above marked functions (•) are manually entered using the UP and DOWN keys.

To calibrate, switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'.

Press button marked PROGRAM. To alter figures in Program, the UP and DOWN keys are used. To change the function, the PROGRAM key and the UP key must be held down simultaneously. Continual pressing of these two keys will cycle through the functions, PADDOCK NR to TEMPERATURE and so on.

If you wish to skip a function on the printout (e.g. TEMP), set this value to zero when calibrating.

Once the program information is entered, the figures will remain the same for all of the Trip Area printouts unless they are altered.

Return 'OPERATE/CALIBRATE' switch to 'OPERATE'.

To initialise the next Trip Area Memory (e.g. Trip 2), while in 'AREA' hold down the UP key for about three seconds. Once in TRIP 2, switch back to 'CALIBRATE' if the Program information needs to be altered.

3.9 FLOW SENSOR CALIBRATION

Some 2300 Spray Monitors have Flow Sensor Selectibility, meaning that you are able to select between a 90 L/MIN Flow Sensor and a 50 L/MIN Flow Sensor. This is mainly used for situations where you may utilise a Loan Unit.

IMPORTANT: If the Flowsensor calibration is incorrectly set on your unit, a 'TANK' and 'RATE' error of approximately 65-70% will occur.

To calibrate, switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'.

Press L/Ha key until either '90L/MIN FLOWSENSOR' or '50L/MIN FLOWSENSOR' is displayed. To change the Flowsensor type, hold down the UP key and the Flowsensor selection should change from one Flow Sensor type to the other.

To return to Rate calibration again press L/HA button.

Once this has been selected, switch 'OPERATE/CALIBRATE' switch to 'OPERATE'.

3.10 SPEEDO CABLE OR TAILSHAFT SENSOR CALIBRATION

This factor is defined as the distance of forward travel between pulses from the Speedo Cable Sensor/ Tailshaft Sensor.

Switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'.

Press WHEEL key and enter a false wheel factor of 5.000 metres.

Press WIDTH key and enter in a false width of 20.00 metres.

NOTE: If solenoids are connected, switch one solenoid 'ON' and enter 20.00 metres.

Return 'OPERATE/CALIBRATE' switch to 'OPERATE'.

Hold down AREA key until 'AREA 0' is displayed on readout.

Hold down RESET key until 'AREA 0' reads 0.00.

Press RUN key, then METRIC key.

Drive slowly forward watching display and stop the vehicle exactly on a display update (e.g. 'AREA 0' 0.01,...,0.03 HA Etc.).

Mark the bottom centre position of any Ground Wheel and peg the ground in corresponding position.

Reset 'AREA 0' again and drive forward in a straight line watching the display until 'AREA 0' reads exactly 1.00 HA, and stop the vehicle.

Measure the distance covered and divide by 100 to calculate the Wheel Calibration.

Example:	Distance covered	=	26.4 metres
	26.4 divided by 100	=	0.264

Switch 'OPERATE/CALIBRATE' switch to 'CALIBRATE'.

Press WHEEL key and enter in true wheel factor using the UP and DOWN keys.

Re-enter true WIDTH factor.

Return 'OPERATE/CALIBRATE' switch to 'OPERATE'.

4.0 OPERATION

4.1 GENERAL INFORMATION

All of the operation functions on your Farmscan 2300 Spray Monitor are written in 'YELLOW' on the front panel.

To obtain ON-THE-GO information, set 'OPERATE/CALIBRATE' switch to 'OPERATE'.

Switch power 'ON' and short beep will be heard. The LCD readout will either display 'CHECK .....CAL', if calibration factors have been lost from the memory, or it will display the last function selected before power was switched 'OFF'.

Obviously Speed, Area Per Hour and Rate functions will only give readouts when the vehicle is in motion. When stationary the readout displays zero's on these selections.

If liquid is being pumped through the Boomspray while it is stationary, Flow (Litres Per Minute), Volume Used and Volume Left will alter. In this case, if using solenoids at least one must be switched 'ON'.

When the vehicle is in motion and you are spraying, all of the other functions (i.e. Area, Rate, Efficiency) will update. These functions can be selected at any time by simply pressing the desired key.

The 1 Amp Power Fuse located at the rear of the Spray Monitor must never be replaced with a higher rated fuse.

Information readouts can only be selected when the 'OPERATE/CALIBRATE' switch is in the 'OPERATE' position.

4.2 MEMORY BACKUP

Your 2300 Spray Monitor has an in built memory backup system that will hold all calibrations and accumulated totals in memory for up to five years after the power has been disconnected from the unit.

4.3 CALIBRATION WARNING

The Spray Monitor has an inbuilt protection system that will warn you if any Calibration Factors are lost from memory or change value without your knowledge.

If for any reason a Calibration Factor does change value, a continuous series of BEEPS will sound and the display will indicate which Calibration Factor has altered (eg. "CHECK WIDTH 1 CAL"). In this case the operator must switch to 'CALIBRATE' and select Width, then re-enter the correct Width value into the Left Boomsection.

The Calibration Warning will only occur when the 2300 Spray Monitor is switched to 'OPERATE'.

4.4 SPEED/AREA PER HOUR (SPEED AND AREA/H)

A Ground Speed readout in Kilometres Per Hour (KPH) or Miles Per Hour (MPH) can be displayed at any time by pressing the SPEED button. Speed is displayed in 1/10th KPH or 1/10th MPH.

If the SPEED button is pressed a second time, the sprayed Area Per Hour (AR/HOUR) will be displayed either in hectares or acres.

4.5 AREA (AREA 0 / AREA 1-9)

When the AREA button is first pressed 'AREA 0' (Total Area) or 'AREA 1' (Trip Area One) will be displayed. To select the other readout simply press the button again.

TOTAL AREA (Area 0) can either be displayed in hectares or acres, and is the addition of Trip Areas One to Nine. Total Area will be displayed in 1/100th increments up to 99.99, then from 100.0 to 999.9 in 1/10th increments, and over 1000 is displayed as whole numbers.

Total Area and Trip Areas will only update while the unit is actually spraying, if all solenoids are shut down then AREA will not accumulate. Nor will AREA update when unit is on 'HOLD'.

To reset TOTAL AREA, hold down AREA button until 'AREA 0' is displayed. Hold down RESET button for approximately 5 seconds and TOTAL AREA should display 0.00 hectares.

By resetting TOTAL AREA all of the Trip Areas will also be reset.

TRIP AREA SELECTION: 'AREA 1' (Trip Area One) is displayed when the AREA Button is pushed; after being in Total Area (Area O).

TRIP AREAS can be displayed in either Hectares or Acres.

When TOTAL AREA is reset, all TRIP AREAS are erased and only 'AREA 0' and 'AREA 1' are able to be selected.

To enter 'AREA 2' the UP arrow must be pressed for about 3 seconds. 'AREA 2 0.00' will be displayed and 'AREA 1' will be put on hold.

Total Area will continue accumulating, now being the addition of 'AREA 1' and 'AREA 2'.

Once 'AREA 2' has been selected, Area will no longer be able to be updated in 'AREA 1' until 'AREA 0' (Total Area) is reset.

Therefore, a new Trip Area can be selected for each new paddock until the nine Trip Areas are used; then Total Area will have to be reset.

To reset current Trip Area, hold down RESET button for 3 seconds while in the current Trip Area.

Previously worked Trip Areas cannot be reset once a new Trip Area is selected.

You may cycle through Total and used Trip Areas simply by holding down the AREA button.

4.6 RATE (L/HA AND L/MIN)

Displays current Application Rate (Litres Per Hectare/UK Gallons Per Acre) and Flow (Litres Per Minute/ UK Gallons Per Minute).

By pressing the L/Ha button, either 'RATE' or 'FLOW' will be displayed. Re-pressing the L/Ha button will display the second function.

The 2300 Spray Monitor has an inbuilt RATE ALARM which will alert the operator should the rate deviate plus or minus the set ERROR percentage. When the Rate Alarm sounds, the display will show either 'FASTER' or 'SLOWER' and display the current application rate.

No matter which other function has been previously selected (e.g. Speed, Total Area), the display will automatically revert to the Rate Readout while in the Rate Alarm Mode.

If the Rate Alarm flashes 'SLOWER' on the display, then you may be driving too quickly for the maximum available flow. The Rate Alarm may also be activated by a pump fault, low working pressure, burst hose, empty tank, blocked filter or blocked nozzles.

4.7 VOLUME USED (VOLUME USED/VOLUME LEFT)

Displays the VOLUME USED from the tank and the VOLUME LEFT in the tank.

When the VOLUME USED button is pressed, one of the above functions will be displayed (e.g. Volume Used — 437.9L). By simply pressing the VOLUME USED button again, VOLUME LEFT will be displayed (e.g. Volume Left — 1562.4L).

Volume is displayed in 1/10th increments up to 999.9 Litres or UK Gallons, then in whole litres or UK gallons up to 9999 (e.g. 1004 L).

IMPORTANT: The VOLUME USED function must be reset each time the tank is re-filled.

To reset, press VOLUME USED button, then hold down RESET button for 3-4 seconds, until Volume Used zeros. This will automatically reset Volume Used, Volume Left and Low Tank Alarm.

The Low Tank Alarm is a visual and audible alarm to alert the operator when there is only 100 Litres left in the tank. When the Low Tank Alarm sounds, 'TANK 100L LEFT' will be displayed on the readout for approximately 5 seconds.

4.8 EFFICIENCY/CLOCK

Efficiency Readout is a percentage amount of the actual spraying time achieved as against total time spent in the paddock this day (e.g. Efficiency 64%).

Each day the Spray Monitor logs on the start time when the power is first switched 'ON'. From then until midnight the amount of time spent actually spraying is calculated.

Therefore, by simply pressing the EFFICIENCY button, you can check daily performance and compare to previous average daily results.

Even when the Spray Monitor is switched 'OFF', the amount of non-spraying time is reflected in the Efficiency Readout.

If necessary the log-on time may be reset by simultaneously holding the EFFICIENCY key whilst turning the Monitor switch 'ON'.

By pressing the EFFICIENCY key again, the monitor will display Date, Month, Year and the Day of the Week (e.g. Date 12/6/89 MO).

By pressing the EFFICIENCY key a third time, the unit will display the time of day (e.g. TIME 4.25). Functions on a 24 hour clock.

4.9 PRINT

The 'PRINT' key activates the 2040 Printer.

Plug the cable from the Printer into the serial port of the 2300 Spray Monitor and turn the Printer 'ON'.

After entering all of the PROGRAM information (seen in section 3.8). Press the PRINT button for approximately 3 seconds, and the information will be downloaded onto the Printer.

When the printer battery starts to get low the Printer will display, 'LOW BATTERY — PLEASE RECHARGE'.

IMPORTANT: When the printer is not being used leave it turned 'OFF' otherwise the batteries will drain.

* Replacement paper (H-100) is special heat sensitive type, available from Computronics International Pty Ltd.

4.10 IMPERIAL/METRIC FUNCTION

The Imperial (IMP) / Metric (MET) Button allows the operator to work in either Imperial or Metric Units. It is important to note that all calibrations must be entered in Metric Units.

Functions available in Imperial/Metric conversions are:

READOUT	IMPERIAL DISPLAY	METRIC DISPLAY
Speed	Miles per hour (MPH)	Kilometres per hour (KPH)
Area per hour	Acres per hour (ACRE/H)	Hectare per hour (HA/H)
Rate	Gallons per acre (G/AC)	Litres per hectare (L/HA)
Flow	Gallon per minute (G/MIN)	Litres per minute (L/MIN)
Area	Acres (AC)	Hectares (HA)
Volume	Gallons (G)	Litres (L)

To convert between IMPERIAL and METRIC measurements simply press IMP or MET buttons while in 'OPERATE' mode.

4.11 RUN/HOLD KEY

By pressing the HOLD key at any time, Total and Trip Areas will cease updating. This will mostly be done when you are moving between paddocks or filling up, but not actually working.

Every 25 seconds after the HOLD key has been pressed, the 2300 Spray Monitor will read 'AREA ON HOLD' for 2 seconds accompanied by 2 short beeps as a reminder.

Press 'RUN' key to resume Area recording.

5.0 MAINTENANCE OF YOUR FARMSCAN 2300 SPRAY MONITOR

Spray Monitor - Store in a dry place when not in use for long periods of time.

Flow Sensor
- Flush out daily with fresh water.
- Check inlet filter for trapped debris.
- Thoroughly clean and coat internally with non-coagulating vegetable oil when not in use for long periods of time.
- Remove dirt and corrosion from the Flow Sensor electrical connections when necessary.

6.0 OPTIONS

6.1 1009 TAILSHAFT SENSOR KIT

KIT INCLUDES:	1	AA-102A	Tailshaft Sensor (Inc. 4m Cable)
	1	AA-423	Tailshaft Magnet on Hoseclamp
	10	HG-702	10 Cable Ties (27mm)
	1	AM-211	1009 Instruction Sheet
	2	HS-8X1/2	8G x 1/2" Self Tapping Screws

The TAILSHAFT SENSOR KIT consists of a Bar Magnet which is fixed onto the tailshaft by a hoseclamp, and a Sensor which transmits pulses to the Monitor.

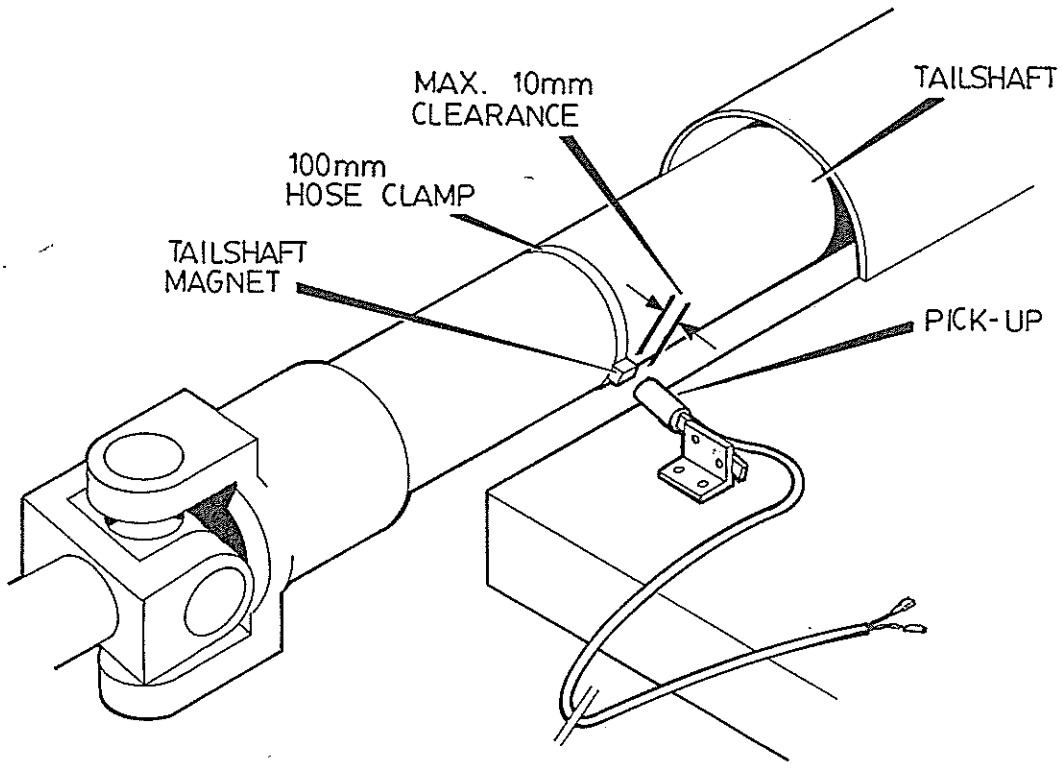
INSTALLATION: Secure Magnet to the Tailshaft using Hose Clamp as shown below.

Bend Aluminium Mounting Strip on Sensor so that no greater than 10mm gap exists between Magnet and Sensor when the tailshaft is turning, secure using Self-tapping Screws provided.

If the tailshaft is likely to move up and down, be sure the Sensor is positioned parellel with either side of the tailshaft to avoid misalignment between the Magnet and Sensor.

Connect the Tailshaft Sensor Cable to Wheel Sensor Connection Points protruding from Pins 10 and 11 at the rear of the Spray Monitor.

NOTE: The Tailshaft Sensor has a limited lifespan when used on 4WD vehicles.



TAILSHAFT SENSOR INSTALLATION

6.2 2005 ELECTRONIC SPEED SENSOR KIT

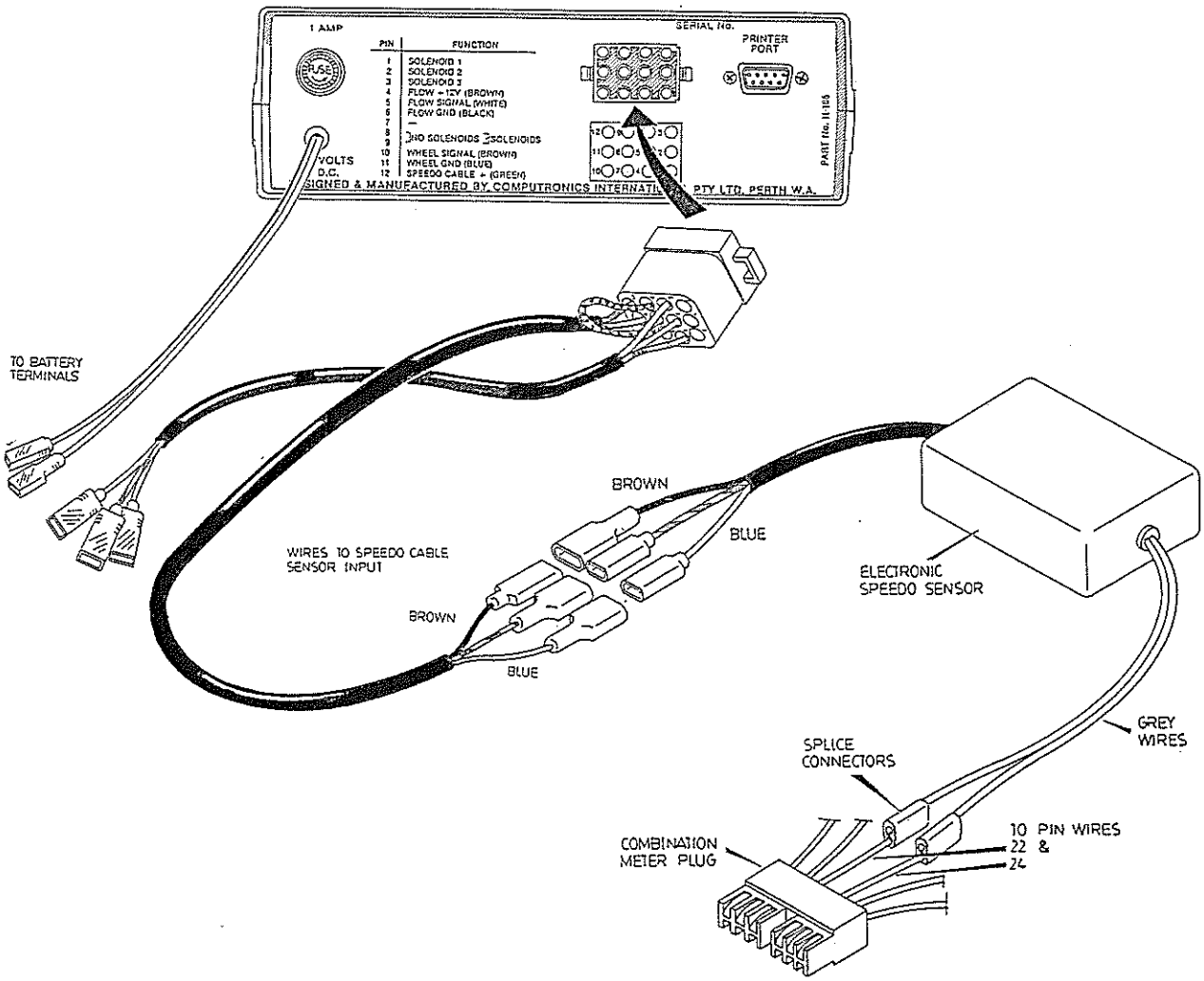
KIT INCLUDES:	1	AA-115	Electronic Speed Sensor
	2	P-058	Splice Connectors
	1	AM-115	2005 Instruction Sheet

The Electronic Speed Sensor Kit has been designed to provide a connection between your vehicle's factory fitted Electronic Speed Sensor and your Farmscan Monitor.

INSTALLATION: The Electronic Speed Sensor Kit is simply plugged into the "Speedo Cable Sensor" wires of the Monitor (i.e. blue wire to blue, brown to brown, and green to green).

Locate Pin 22 (blue) and Pin 24 (green) at rear of speedo readout on dashboard. Use Splice Connector to connect one grey wire to blue (Pin 22) wire, and another to connect one grey wire to green (Pin 24) wire. It does matter which grey wire, so if the unit does not operate simply switch the wires - no damage will have been done.

To calibrate, it is simply a matter of following calibration procedure for "Speedo Cable Sensor".



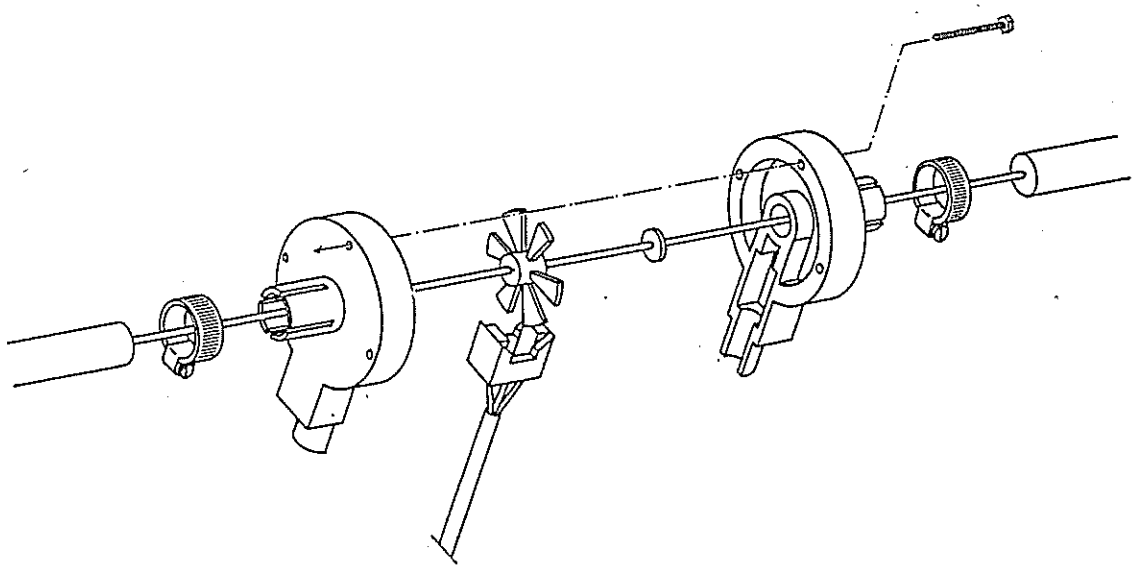
6.3 2006 SPEEDO CABLE SENSOR KIT

KIT INCLUDES:	1	A-2006	Speedo Cable Sensor
	2	AH-422	15mm Hose Clamps
	1	AM-237	2006 Instruction Sheet

In situations where fitting a Wheel Sensor is impractical (e.g. 4WD vehicles or trucks) the 2006 SPEEDO CABLE SENSOR may be fitted to the speedo drive cable as an alternative reference Wheel Pick-up point.

INSTALLATION: Decide on a suitable position to fit Sensor and mark cable clearly — **must be on straight section of cable.**

* Remove speedo cable from vehicle.
* Withdraw inner drive cable from outer sleeve.
* Using a fine toothed hacksaw, cut outer sleeve where marked and make second cut to shorten one of the portions by 20mm to accommodate the Sensor.
* De-burr the cut ends of the two portions.
* Wipe all excess oil and grease from inner drive cable.
* Loosely fit hose clamps to socket ends of Sensor.
* Feed inner drive cable into the portion of the outer sleeve to which the speedo drive cable must be fed first (this may be from either the gearbox end, or from the speedo end).
* Slide the protruding drive cable through the centre of the Sensor and firmly seat the Sensor on the protruding end of the outer sleeve.
* Fit the second portion of the outer sleeve into the other Sensor socket and tighten clamps.



WARNING: It is essential not to overtighten clamps or the outer sleeve will bind on the inner drive cable with resultant damage.

* Check that there is no binding of the cable by spinning the inner drive cable by hand.
* Re-fit speedo cable to vehicle, ensuring that the Sensor Cable to the Monitor exits gently from the Sensor not pulled at right angles.

Connect spade terminals from the Speedo Cable Sensor into their mates from the Monitor Plug (i.e. Green to Green, etc.).

NOTE: If connection terminals on the 2006 Speedo Cable Sensor do not correspond to the connections of the plug at the rear of the monitor, then you have the incorrect Speedo Cable Sensor. If unsure check with your local Farmscan Dealer.

6.4 2040 PRINTER KIT

KIT INCLUDES:	1	A-2040	Printer
	1	AM-219	2040 Instruction Sheet

The FARMSCAN 2040 PRINTER KIT has been designed to give the operator a 'hard copy' of work completed.

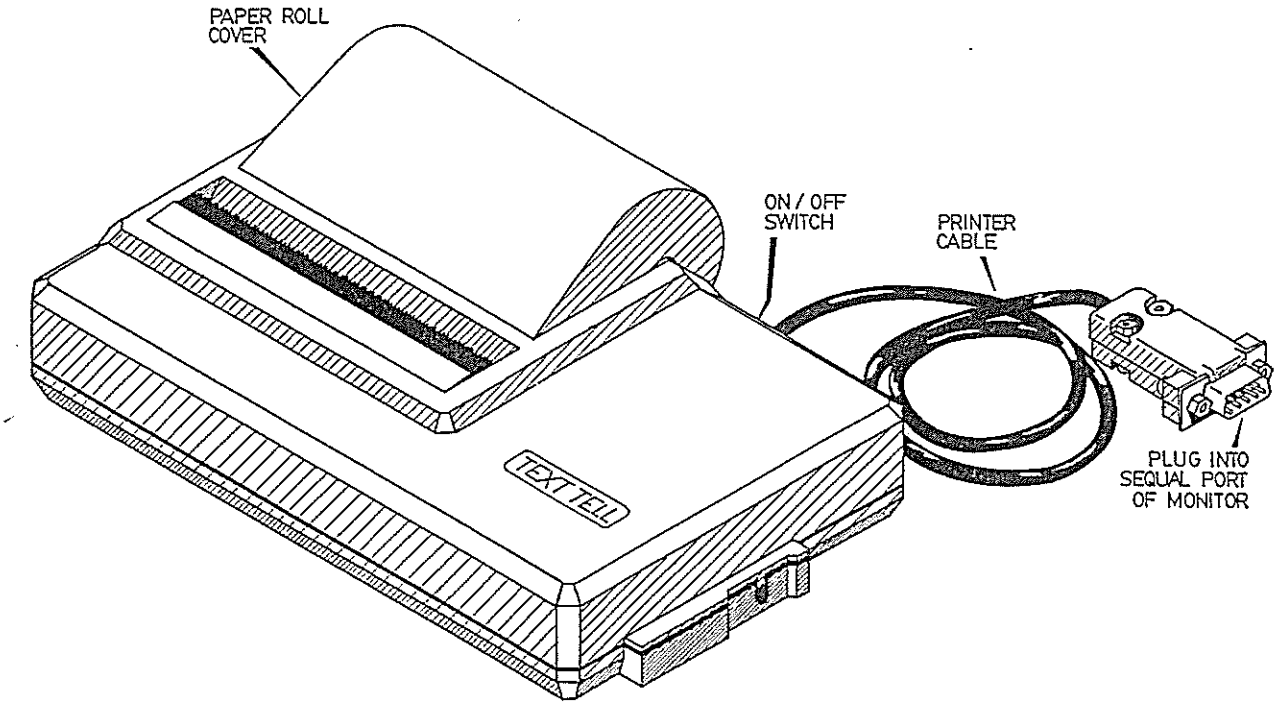
Plug the Printer Cable into serial port of Monitor and turn Printer 'ON' (Switch at rear of printer).

After entering all of the data into the Monitor, hold down the PRINT button for 3 seconds and the information will download onto the Printer.

When the rechargeable Printer battery starts to get low, the Printer will display, 'LOW BATTERY — PLEASE RECHARGE'.

To recharge the battery simply turn the Printer 'OFF' and leave the Monitor turned 'ON' with Printer connected. When the Printer is not being used, leave it turned 'OFF' otherwise the batteries will drain.

* Replacement Printer Paper (AH-100) is a special heat sensitive type, available from Computronics International Pty Ltd.



7.0 TROUBLESHOOTING:

PROBLEM	CHECK PROCEDURE
1. NO POWER AND NO DISPLAY.	a. Check Power Cable connections at rear of Monitor; push connectors together firmly. b. Ensure Red wires (+) match and Black wires (-) match. c. Check that connections to battery are clean and secure. d. Check that the POWER FUSE is intact by some means other than visual (multimeter or testlight). e. Check that RED WIRE is to POSITIVE (+) battery terminal and BLACK WIRE is to NEGATIVE (-) battery terminal. f. Check voltage from battery with Multimeter, it should be 12 — 13.8 VDC. g. Inspect Power Cable for damage and check voltage at Monitor end of Power Cable. h. Do not use Power Cable to power any other instruments while it is powering your Spray Monitor, otherwise electrical interference may occur. NOTE: Monitor will not respond to less than 11.5 volts DC.
2. DISPLAY DROPS OUT WHEN ENGINE IS STARTED.	a. If display comes back when engine is running, indicates momentary low voltage. b. If the display goes blank or squares appear on the display while the engine is running, check battery connections and ensure that they are clean and tight. c. Try powering Spray Monitor from a fully charged independent battery.
3. 'CHECK ... CAL' ON DISPLAY.	Indicates calibration factor/s lost from memory. The display will tell you which calibration factor has been lost from memory (e.g. "CHECK WHEEL CAL"). a. Switch to CALIBRATE mode and correct the calibration factor indicated as being wrong. b. If "CHECK ...CAL" re-occurs regularly you probably have an interference problem. Electrical Interference can be caused by: Vehicle having petrol engine — fit carbon ignition leads and suppressors, UHF Radio Antenna — ensure Power Cable of Spray Monitor is as far away from Radio Antenna Lead as possible. c. Try to re-position Spray Monitor, disconnect Sensor Cables or re-route Power Cable to eliminate source of interference.
4. SPEED READOUT INCORRECT OR ZERO.	a. If over or under reading, WHEEL factor must be incorrect — re-check measurement and calibration. b. Check that Wheel Sensor is 15-20mm away from Wheel Magnet. NOTE: If Magnet is too close to Sensor, erratic speed readouts may result. c. If readout jumpy — indicates impulses from Wheel Sensor/Speedo Cable Sensor are inconsistent. Check for poor or intermittent connection of Sensor Cable, or worn through wire rubbing to chassis. d. If readout stays at zero, make sure 12 Pin Input Plug is properly inserted and check that pins in socket and plug at rear of Monitor are not pushed out. Follow WHEEL SENSOR or SPEEDO CABLE SENSOR fault procedure.

5. WHEEL SENSOR FAULT.

a. Check clearance between Wheel Magnet and Sensor (should be 15-20mm).

b. Select 'OPERATE' mode and press 'SPEED' key.

c. Disconnect Wheel Sensor at rear of Monitor. Tap ends of brown and blue Wheel Sensor connections together on Monitor side, about twice per second, while watching digital readout.

d. If random speed readout occurs then Monitor is okay — proceed to test Sensor or replace.

e. If no speed readout, return Monitor for repair.

TO TEST WHEEL SENSOR

Disconnect Sensor at rear of Spray Monitor.

Connect a multimeter on OHMS range directly to Wheel Sensor cables. When Magnet is aligned with Sensor, multimeter needle should swing to right of meter scale. When Magnet is away from Sensor, needle should stay to left of scale. If needle stays in the same position under both conditions then replace Sensor.

NOTE: Test your multimeter first by crossing test probes together needle should swing to right of scale. DO NOT use testlight to check Wheel Sensor.

6. SPEEDO CABLE SENSOR FAULT.

a. Check connections of plug and wires at Spray Monitor, ensure wires do go to correct inputs.

b. Check speedo drive cable does not bind.

c. Disassemble Sensor housing and inspect for broken wires.

d. Make sure plastic disc on cable inside Sensor is not slipping or jammed.

e. Remove excessive oil build up inside Sensor, particularly across electric eye.

f. You can't test past this point, so either replace Sensor or return for repair.

7. TOTAL AND TRIP AREAS INACCURATE OR NOT WORKING.

a. Is 'SPEED' readout steady? If not, follow troubleshooting section 4.

b. Re-check WHEEL and WIDTH measurement then make sure they are correctly entered into Spray Monitor. Must be in metric measurement.

c. Is the RUN/HOLD Function being used? If not, Spray Monitor may over-read area.

d. Did you unintentionally reset a Trip Area, or both the Total and Trip Areas?

e. Check Imperial/Metric Function.

8. AREA METER NOT WORKING.

a. Check speed readout — if no speed see Troubleshooting section 4.

b. Push 'RUN' key.

c. Switch to 'CALIBRATE' mode and ensure widths are switched in if solenoids are used.

d. Make sure link wire is in place between pins 8 & 9 of 12 Pin Input Plug if no solenoids are used.

9. RATE READOUT STAYS AT ZERO.

a. Switch to 'OPERATE' mode.

b. Push SPEED key while driving and if no speed readout follow TROUBLESHOOTING section 4.

c. While Spraying, push AREA key and select AREA 0, if no Area records, follow TROUBLESHOOTING Section 8.

d. Run pump with boom operating then push VOLUME USED key and select METRIC.

e. If litres not accumulating, disconnect Flow Sensor then tap white and black wires on Spray Monitor side together. Every eight to ten times should register 1/10th litres used.

Do not under any circumstances, touch BROWN WIRE (+12V) to WHITE WIRE or BLACK WIRE.

f. If litres do not register at this point check wiring and connections to Spray Monitor for damage or poor contact.

g. Disconnect Flow Sensor wire at rear of Monitor and repeat test between white and black wires from 12 Pin Input Plug. If still no response, check pin connections into Spray Monitor and if no fault found return Monitor for service.

h. If Monitor and cables check out okay, check filter on inlet side of Flow Sensor is not blocked. NOTE: Flow Sensor cannot be tested with a MULTIMETER — return to COMPUTRONICS for testing.

10. FLOW SENSOR GIVES INACCURATE READINGS.

a. Make sure Flow direction arrow on metal housing follows direction of flow.

b. Check Flow Sensor calibration corresponds to type of Flow Sensor you are using. To check follow Flow Sensor calibration procedure explained in section 3.8.

c Check all wiring from Flow Sensor to Spray Monitor to ensure there is no poor or intermittent connections or worn through wires rubbing to chassis.

d. Return Flow Sensor to Computronics for calibration check.

11. UNABLE TO LOCATE FAULT

SEND TO: Your nearest FARMSCAN DEALER OR
COMPUTRONICS INTERNATIONAL PTY. LTD.
31 Kensington Street, East Perth 6004
Phone: (09) 221 2121 Fax: (09) 325 6686