

Spray Monitor **2300**

Installation and Operation Instructions

Version 4.0

Spray monitor **2300**

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PARTS LIST

REF	PART NO.	DESCRIPTION	QTY
1	A-2300/3	SPRAY MONITOR SERIES 3	1
2	AH-861	SECURING KNOBS	2
3	AH-406	MONITOR MOUNTING BRACKET - XM	1
4	AH-501	WEATHER COVER XM SERIES	1
5	AC-101	8m POWER CABLE	1
6	AH-408	UNIVERSAL HARDWARE PACK	1
7	AC-2200S	SPRAYER WIRING LOOM	1
8	AA-121	FLOW SENSOR (2-90 LPM)	1
9	AC-905	4 SECTION INPUT LOOM	1
10	HH-1100	1" POLY NIPPLE	2
11	AH-200	TURBINE REMOVAL TOOL	1
12	AA-110P	REED TYPE SENSOR	1
13	AA-133	MINI WHEEL MAGNET & NUT	2
14	HG-706	CABLE TIES	20
15	AM-200	WARRANTY CARD	1
16	AM-2300 V3.2	INSTRUCTION MANUAL	1
18	AC-2040A	PRINTER ADAPTER PLUG	1
19	AMQ-2300	QUICK GUIDE	1

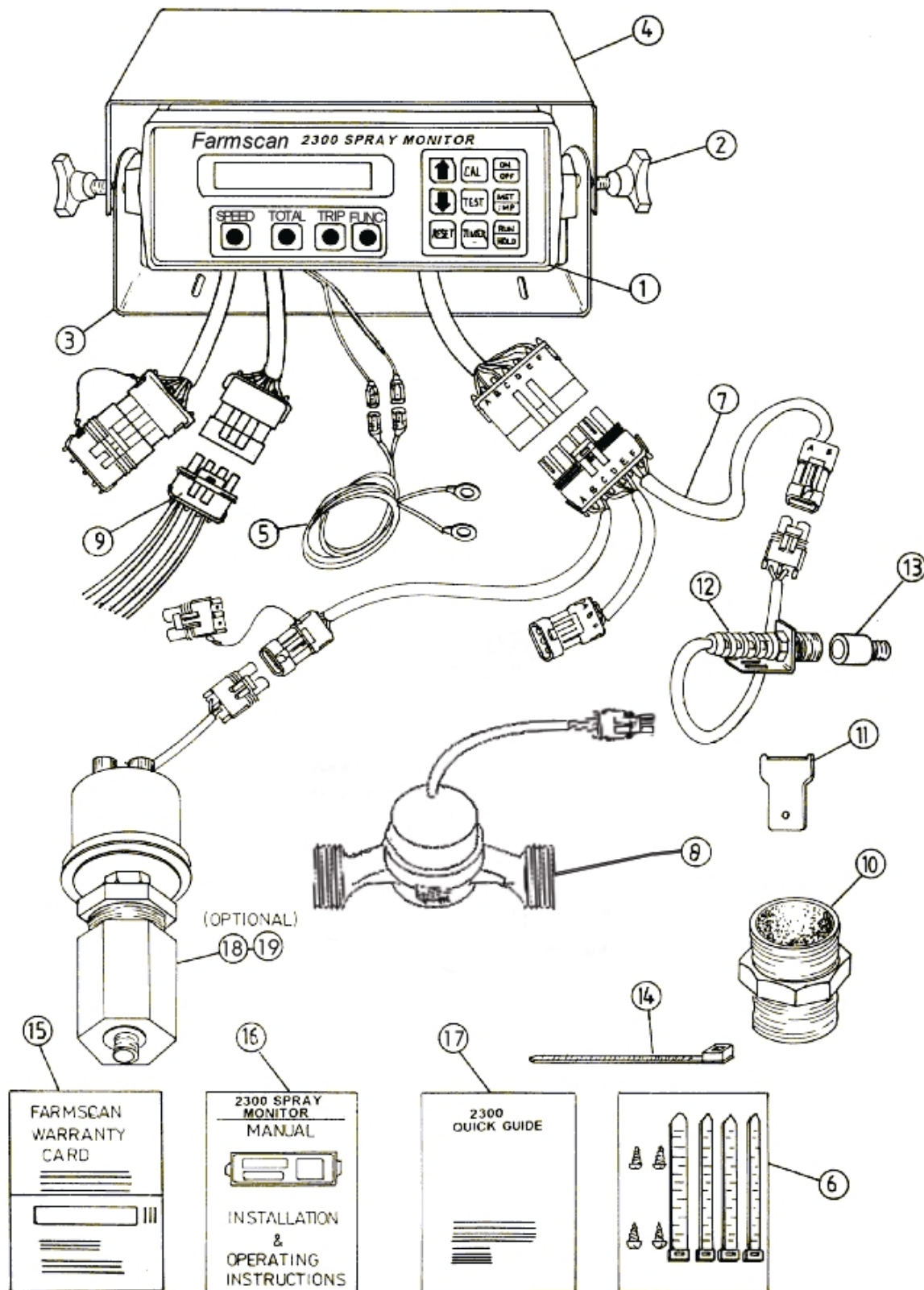
OPTIONAL SENSORS

REF	PART NO.	DESCRIPTION
17	2015	PRESSURE SENSOR KIT (0-500 KPA)
18	2025	PRESSURE SENSOR KIT (0-25 BAR)

OPTIONAL CABLES

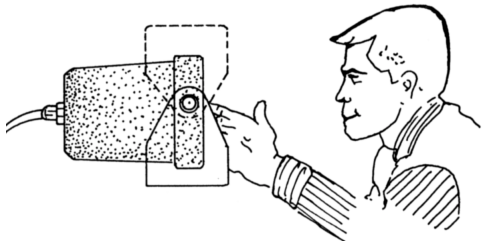
PART NO.	DESCRIPTION OF KIT
AC-205	5m 2 WAY EXTENSION CABLE
AC-305	5m 3 WAY EXTENSION CABLE

PARTS PICTORIAL - 2300 SPRAY MONITOR SERIES 3 KIT



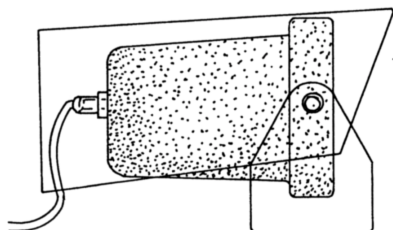
1.0 INSTALLATION

1.1 MONITOR INSTALLATION



CAB TRACTORS

Install monitor on bracket supplied clearly visible to operator & within easy reach of section 'ON / OFF' controls (if used).



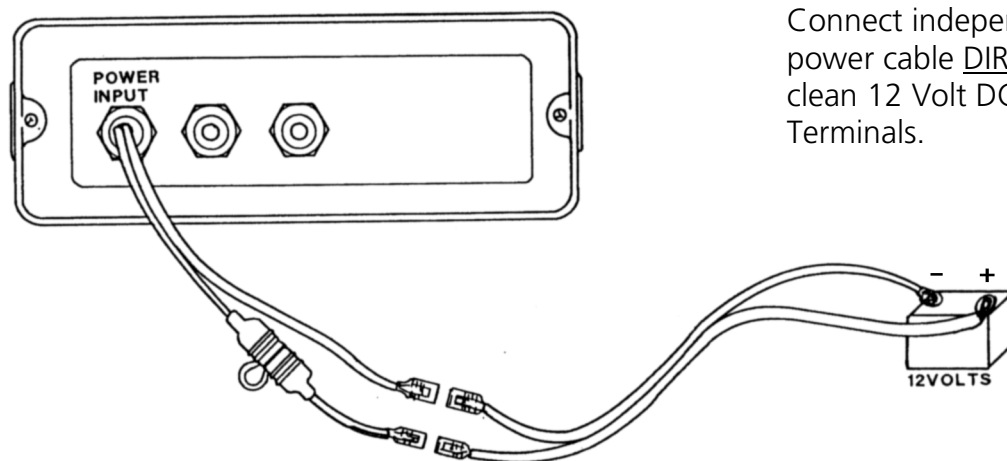
OPEN TRACTORS

Install monitor in horizontal position and use Weather cover & Bracket to protect monitor from direct weathering.

Monitor is sealed and able to withstand light overspray. Remove from sprayer when not in use.

! DO NOT WASH DOWN MONITOR WITH HOSE OR PRESSURE CLEANER.

1.2 POWER CONNECTION

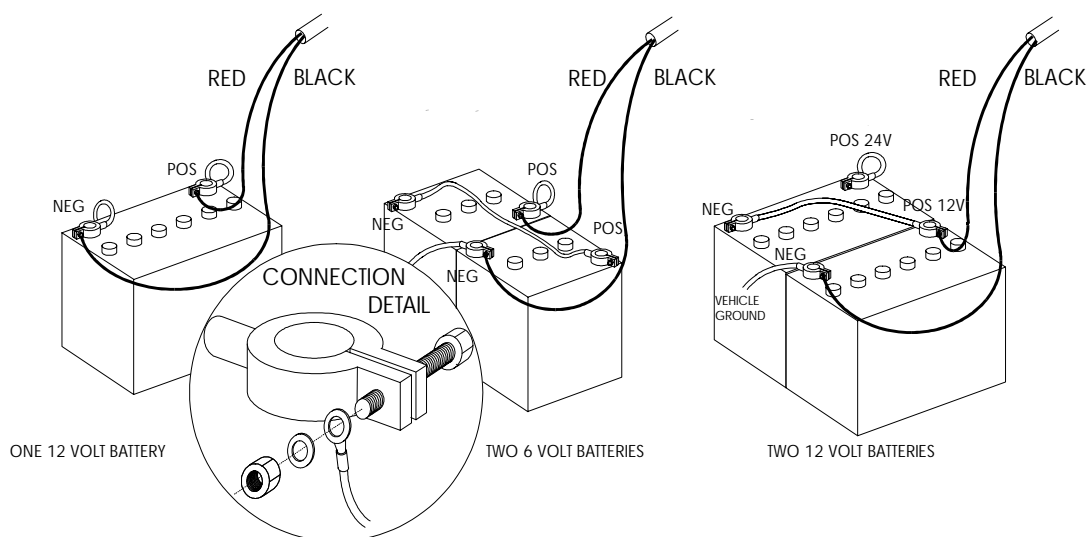


Connect independent power cable DIRECT to clean 12 Volt DC Battery Terminals.

Use cable ties to secure Power cable away from risk of damage

! DO NOT CONNECT OTHER EQUIPMENT TO MONITOR POWER CABLE - INTERFERENCE MAY RESULT.

TYPICAL BATTERY HOOK-UPS



! DISCONNECT MONITOR POWER CABLE WHEN ARC WELDING ON MACHINERY.

1.3 SENSOR & WIRING INSTALLATION

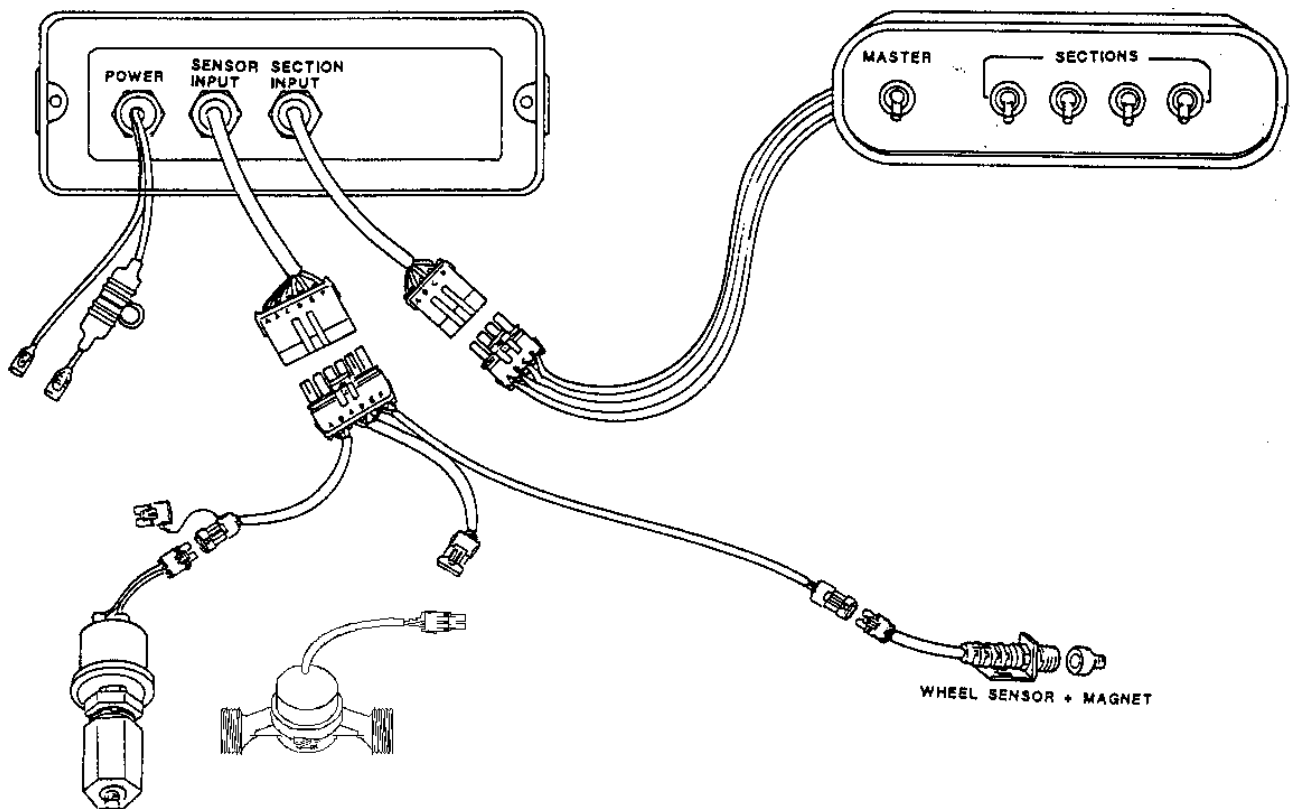
Install all sensors first, then lay out sprayer wiring loom on machine and direct longest cable to the wheel sensor, and the shorter cables to the flow sensor and pressure sensor. (For loom details see section 6.0 page 39 of this manual)

Secure sprayer loom neatly to machinery framework with cable ties to avoid risk of damage.

An optional 5m main loom extension cable is available if required - part no. AC-605.
Individual 2 way or 3 way sensor extension cables are also available to extend the sensors.

The sprayer wiring loom connects direct from the sensor input tail of the spray monitor to the flow sensor, wheel sensor and pressure sensor (optional if used).

A separate tail marked section input allows connection of up to 4 independent section control switches which must be linked to the spray monitor to enable adjustment of separate widths of operation and to automatically place the 'monitor on hold' when the master section control is switched 'off'.



1.4 FLOW SENSOR INSTALLATION

The flow sensor must be installed in the main delivery line to the spray nozzles before any section controls, but after tank bypass or return lines. Ensure the flow sensor can be easily removed for turbine servicing.

The operating flow rate must be in the range of 2 - 90 L/MIN and the maximum pressure must not exceed 1000 kPa (145 psi).

Other flow sensors are available through your Farmscan dealer. To handle different flow rates and pressures.

Check minimum & maximum L/MIN as follows:

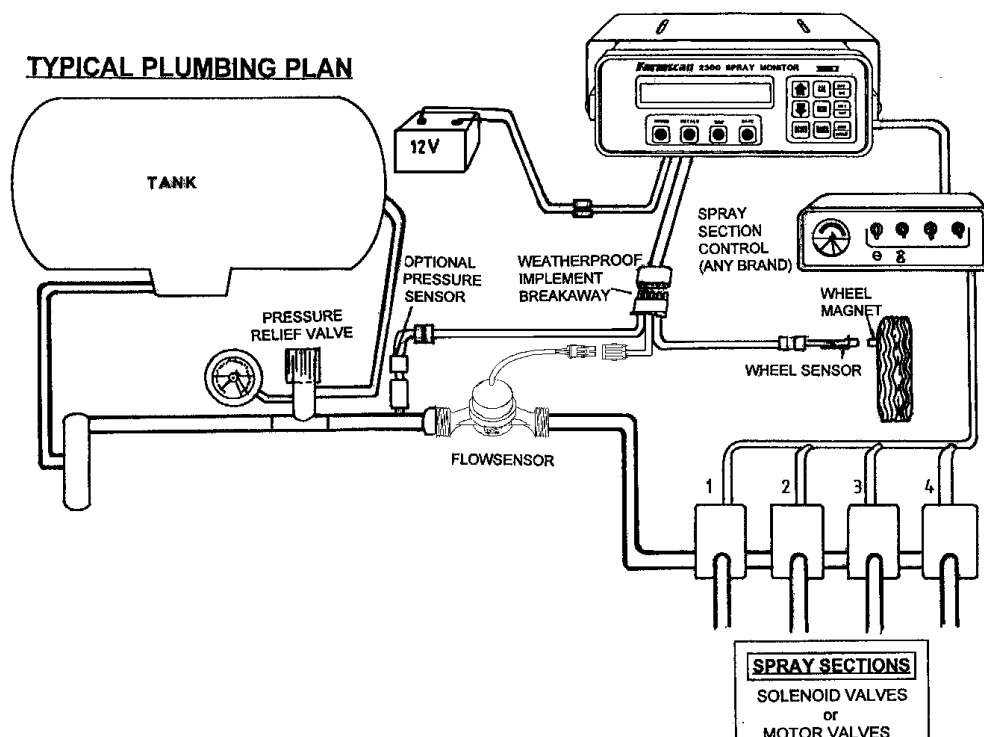
$$\frac{\text{L/HA} \times \text{WIDTH} \times \text{SPEED}}{600} = \text{L/MIN}$$

e.g. $\frac{300 \text{ L/HA} \times 4 \text{ M} \times 4 \text{ KPH}}{600} = 8 \text{ L/MIN}$

Before installing the flow sensor, blow softly into the **inlet** side and check that the turbine spins freely. The flow sensor's PPL factor is fixed at 45.6.

There must be no return flow to tank after the flow sensor metering point, all the liquid being delivered to the target must pass through the flow sensor.

IMPORTANT: Ensure flow direction arrow points in the same direction to flow. Use 1" BSPT nipples to connect in and out of flow sensor - incorrect or over length threads may damage flow sensor.



1.5 WHEEL SENSOR INSTALLATION

The standard wheel sensor supplied with the spray monitor kit, consists of a reed type sensor and two magnets to be fitted onto any undriven ground wheel of the tractor or sprayer.

Each magnet activates the reed type sensor as it sweeps past.

Alternatively speedo drive cable, radar or tailshaft sensors are available if required. Interfacing to existing radar speed sensor is available (2004A Radar Interface)

WHEEL SENSOR INSTALLATION PROCEDURE

Bolt the wheel magnets onto the inside of wheel in a position that allows each magnet to sweep directly past the wheel sensor within 15 - 20 mm clearance.

Magnets must be exactly opposite to achieve the same interval between pulses.

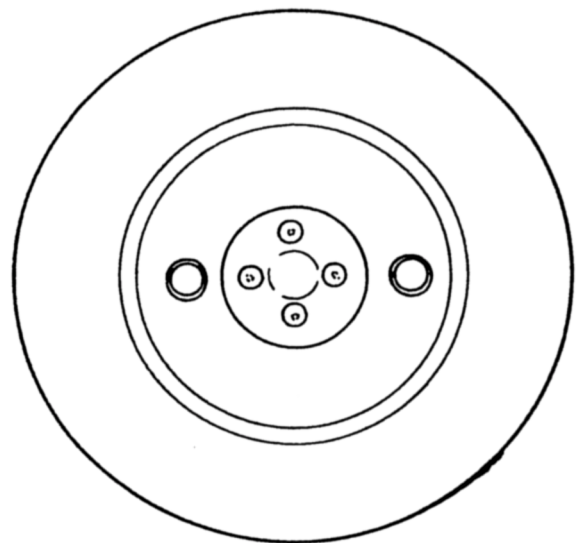
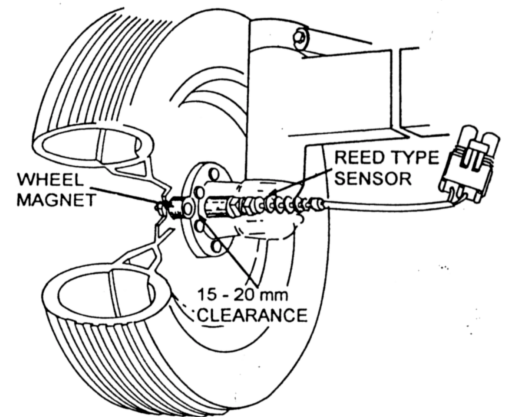
Magnets can be mounted anywhere in a radius from centre of the wheel. Nearer To the hub will ensure the best ground clearance.

The sensor must be rigidly bolted to an existing structure, ideally in a protected Position, to face the **magnets** as shown.

If mounting the sensor on a steered wheel, make sure the **sensor** moves with the steering mechanism to maintain equal clearance between the **magnets** and sensor when turning from lock to lock.

Connect **sensor** to sprayer wiring loom, and use cable ties to secure cable away from potential damage. Allow enough slack for axle movement and steering.

NOTE: **magnet** thread may be cut off and magnet glued onto wheel using Araldite.



1.6 PRESSURE SENSOR INSTALLATION (OPTIONAL)

There are 2 types of Pressure Sensor available for use with the spray monitor.

2015	PRESSURE SENSOR KIT (0-500 KPA)
2025	PRESSURE SENSOR KIT (0-25 BAR)

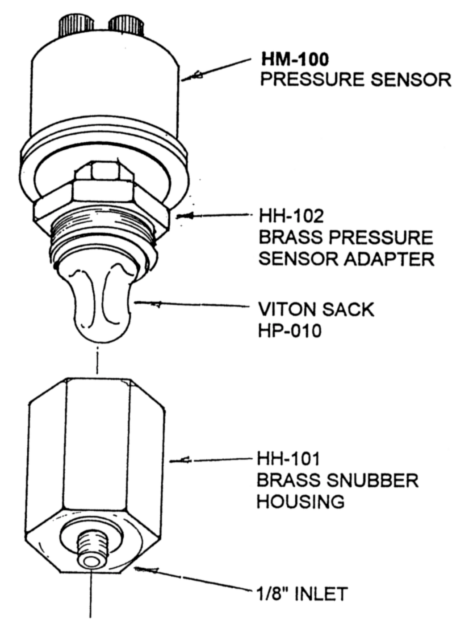
The pressure sensor is supplied complete with brass "snubber" which acts to protect the sensor mechanism from chemical damage.

The top brass section of the snubber may be unscrewed to allow cleaning of powder build up on the inlet side of the bottom section.

The sensor mechanism should not be removed from the top brass section, which contains a measured quantity of a special oil inside the Viton Sack.

PRESSURE SENSOR INSTALLATION PROCEDURE

1. Screw Pressure sensor unit into a 1/8" bsp threaded hole on the delivery line, immediately after the flow sensor but before sectional valves. Use thread sealant (thread tape) to enable a liquid tight seal.
2. Connect the pressure sensor tail to the screw terminals on pressure sensor, positioning the spring washer between the eye and the nut. polarity of these wires is not important.
3. Plug the pressure sensor into sprayer loom socket with blanking plug.
4. If the snubber inlet becomes blocked with suspension chemicals, place the bottom section of the snubber in a vice and gently unscrew top section containing oil in one piece. Clean bottom section and reassemble without disturbing viton diaphragm containing oil.



1.7 SECTION INPUT WIRING

Sprayers that use solenoid or electric control valve (ec) section control require a simple connection to each controlling switch to enable input of separate width factors for each section.

In this way, the spray monitor can calculate the correct rate and area sprayed whenever sections are switched on or off. The operator must make **manual adjustments** to pressure or speed to compensate when sections are switched on & off.

NOTE: Sprayers with manual control valves or lever control of sections can not be connected in this manner & therefore the operator must not shutdown sections unless the overall width calibration is altered accordingly.

CONNECTION DETAIL

Your independent section control panel must be connected to the same tractor 12 Volt source as the spray monitor.

A maximum of 4 solenoid valve control switches or 3 (ec) electric control valves and one master switch can be connected.

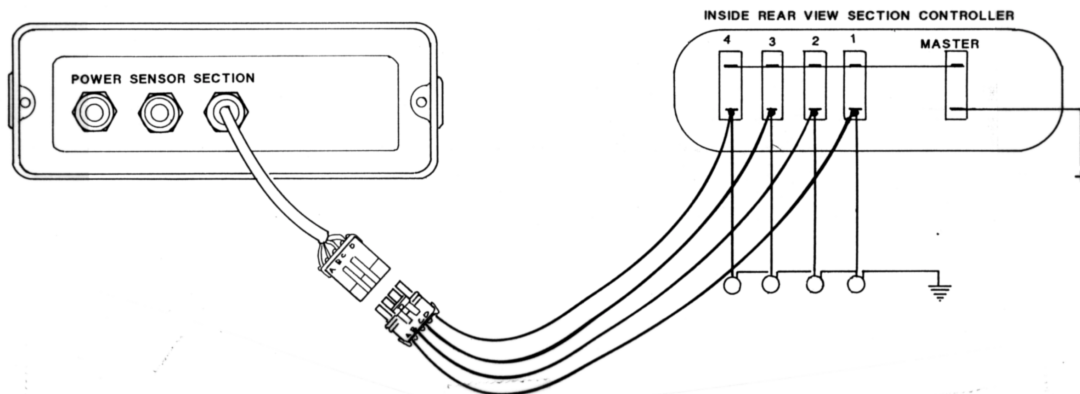
! DO NOT JOIN POWER WIRES OF SECTION CONTROL PANEL TOGETHER WITH SPRAY MONITOR POWER CABLE.

1. Disassemble your section control panel and locate the terminal or connection that is 'LIVE' when each section is 'ON' and 'DEAD' when the section is 'OFF'.
Use a test light or multimeter for this test.
2. Connect section input loom to spray monitor and run coloured wires to sections control panel.
3. Solder or join each section input wire from monitor together with a switched wire from each controlling switch in the following sequence.

Remove any wires not used from 4 way plug.

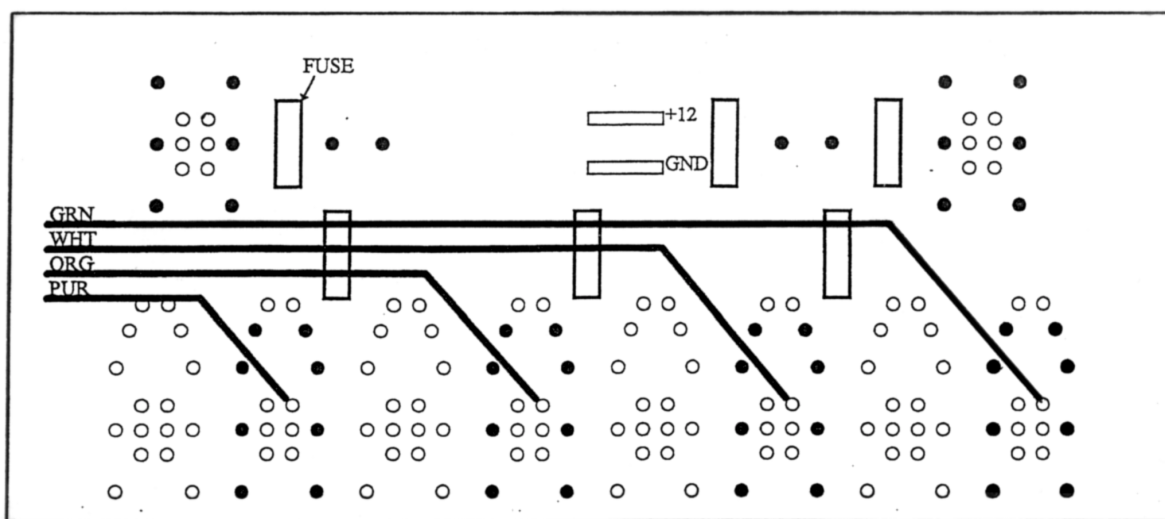
SOLENOID CONNECTION DETAILS

(EC) CONTROL VALVE CONNECTIONS	
SECTION 1	WHITE
SECTION 2	ORANGE
SECTION 3	PURPLE
MASTER	GREEN



HARDI EC CONTROL VALVE CONNECTION

SOLENOID CONNECTIONS	
SECTION 1	WHITE
SECTION 2	ORANGE
SECTION 3	PURPLE
SECTION 4	GREEN



CALIBRATION

DEFAULT SETTING PROCEDURE

Before calibration, the Spray monitor must be set for either standard or EC default mode.

EC MODE	YES	=	Electric Control Valves used (EC MODE)
EC MODE	NO	=	Solenoid or No Valves used (STANDARD MODE)

1. Switch spray monitor off using 'ON / OFF' key.
2. Hold down 'CAL' key & simultaneously switch spray monitor power **on** again.

eg

EC MODE	NO
---------	----

3. To change EC Mode, use 'UP' or 'DOWN' arrow key to make your selection.
4. Now Press 'CAL' key again to escape from default mode into normal operation.
5. Switch spray monitor power off & back on to check correct default mode is displayed at start up.

eg

VERSION 4.0 EC MODE

GENERAL OUTLINE

Before operating the spray monitor you must establish and enter various calibration factors relevant to your sprayer.

Once entered in memory these factors will remain constant unless changed by the operator.

Follow the wheel and flow calculation procedure to determine these factors before proceeding to set up unit - See section 2.1 & 2.2

By pressing the 'CAL' key you can step from one calibration factor to the next.

Each time you press CAL, the next calibration option will be displayed

Use the 'UP' and 'DOWN' arrow keys to change a calibration number (factor) on display, or to change from yes to no.

The 'RESET' key can be used to zero any calibration factor on display.

If you wish to step back to a previous 'CAL' option, you must first go out of 'CAL'.

eg. Press 'SPEED' key then start again by pressing CAL.

2.1 WHEEL FACTOR CALCULATION

1. If the wheel sensor is subject to changing tyre load, then half fill tank.
2. Measurement procedure must be performed in working conditions, not on a tarmac (recheck measurement when moving from hard to soft conditions).
3. Switch monitor 'ON' and press 'TEST' key to display "TEST WHEEL" counter.

eg

TEST WHEEL	0
------------	---

4. Creep vehicle forward and stop exactly on a pulse count, then press 'RESET' key to bring "TEST WHEEL" counter back to zero.
5. Peg ground at bottom centre of any wheel as a starting reference point for measurement.
6. Drive forward for approximately 25 metres or more and stop exactly on a pulse count.

eg

TEST WHEEL	14
------------	----

NOTE: Go forward, Do Not Reverse if you miss a pulse.

7. Now measure the exact distance travelled to bottom centre of same tyre and divide the pulses counted into the distance covered.

e.g. Distance 25.86 metres ÷ 14 pulses = 1.847 M / PULSE

8. Record wheel factor for calibration setting as explained in section 2.4.

2.2 FLOWSENSOR FACTOR CALCULATION

The AA-121Farmscan flow sensor has a fixed PPL calibration factor of 45.6 for water.

Calibration factors will vary with liquid viscosity and different installations or flow sensor types and must be checked before spraying chemicals

FLOWSENSOR TEST METHOD

! WARNING - TAKE PRECAUTION TO AVOID SPLASHBACK INJURY

For best results, test should be carried out at normal operating flow rate.

1. Make sure flow sensor is fully primed, remove a hose after manual or electric control valve to make start / stop of test more precise.
2. Prepare a container of known volume 20 Litres or more with accurate markings, or check quantity in a smaller measure jug.
3. Switch monitor on and press 'TEST' key to display "TEST FLOW", then press 'RESET' to clear any total on display.

eg

TEST FLOW	0
-----------	---

4. Start pump, open control valve until the required test quantity is obtained, then take note of the total pulses counted.

eg

TEST FLOW	586
-----------	-----

5. Check the liquid quantity with a graduated jug, then divide the total pulses by the measured quantity.

eg PULSES = 586
LITRES = 21.4

$586 \div 21.4 = 27.4$ Pulses Per Litre

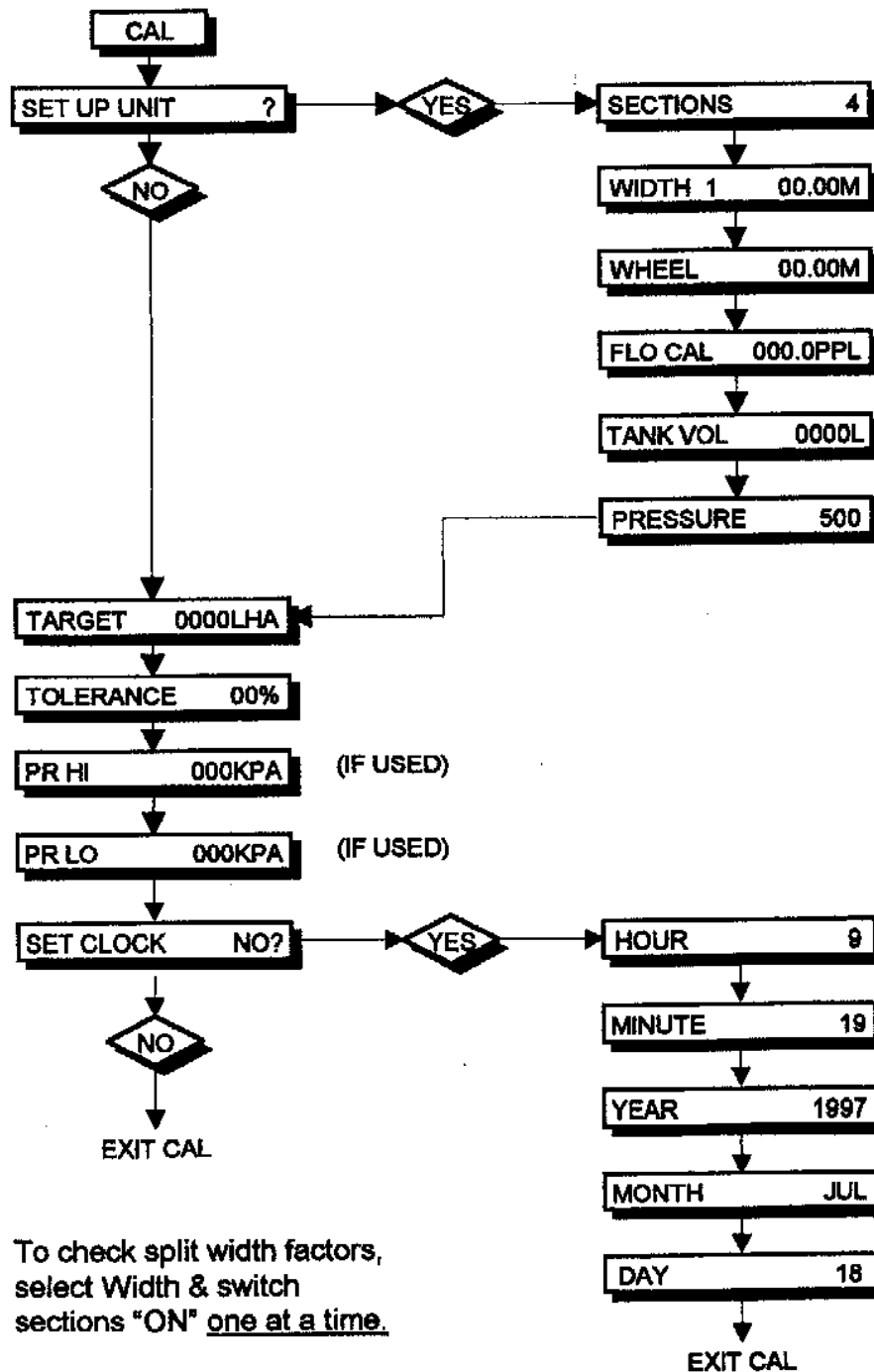
6. repeat test a couple of times to check accuracy then record factor for flow cal setting as explained in section 2.4.

2.3 CALIBRATION PROCEDURE

The calibration function is broken into two distinct areas.

1. SET UP UNIT YES - Fixed factors that you set once only.
2. SET UP UNIT NO - Variable factors that you might change daily.

Fixed calibrations must initially be set before variable factors can be entered.



NOTE: To check split width factors, select Width & switch sections "ON" one at a time.

2.4 SETTING FIXED CALIBRATION FACTORS

Press 'CAL' key to display "SETUP" option.

eg

SET UP UNIT ?	NO
---------------	----

Use 'UP' key to say "YES"

eg

SET UP UNIT ?	YES
---------------	-----

Press 'CAL' to proceed into sections set up mode.

Eg

SECTIONS	1
----------	---

Use 'UP' / 'DOWN' keys to select number of sections used.

Standard Mode Select 1 - 4 Sections
EC Mode Select 1 - 3 Sections

NOTE: For manual section control, set 1(one) section only.

Press 'CAL' to proceed.

One Section use 'UP'/'DOWN' keys to set width of spray swath, then press 'CAL' to proceed.

eg

WIDTH 1	12.00 M
---------	---------

Split Sections, ensure all section switches are 'OFF' and master switch 'ON'.

eg

WIDTH	OFF
-------	-----

Now switch section 1 'ON' and use UP / DOWN to set "WIDTH" of "SECTION 1"

Eg

WIDTH 1	4.50M
---------	-------

Now switch section 1 'OFF' and switch section 2 'ON', then set section 2 width.

eg

WIDTH 2	2.50M
---------	-------

Now repeat process for switches 3 and 4 if used.

Switch all sections 'ON' to check overall width is correct.

eg

WIDTH ALL	18.00 M
-----------	---------

Now flick master switch 'OFF' and all widths should be 'OFF'.

eg

WIDTH OFF

FIXED CALIBRATION FACTORS con't

Press 'CAL' key to proceed to wheel calibration.

eg

WHEEL	0.00 M
-------	--------

Use 'UP' / 'DOWN' to set wheel factor. - See 2.1 for procedure.

eg

WHEEL	2.42 M
-------	--------

Press 'CAL' to proceed and set flow sensor calibration factor. - See 2.2 for procedure.

eg

FLO CAL	27.4 PPL
---------	----------

Press 'CAL' to proceed to "TANK VOLUME" calibration and use 'UP' / 'DOWN' to set total litres in tank.

Eg

TANK VOL	3000L
----------	-------

Press 'CAL' to proceed to pressure sensor calibration and leave off if no pressure sensor installed.

eg

PRESSURE	OFF
----------	-----

Use 'UP' / 'DOWN' key to select pressure sensor type, either 500 kPa or 25 BAR maximum. (if used)

eg

PRESSURE	500 KPA
----------	---------

Press 'CAL' again to end **fixed calibration set up** and skip direct to variable calibration factors.

2.5 SETTING VARIABLE CALIBRATION FACTORS

Press 'CAL' key to display "SET UP" unit default.

eg

SET UP UNIT?	NO
--------------	----

Press 'CAL' again to proceed straight to variable factors.

eg

TARGET RATE	0 LHA
-------------	-------

Use 'UP' / 'DOWN' keys to set "TARGET RATE"

eg

TARGET RATE	600 LHA
-------------	---------

Press 'CAL' again to set acceptable "RATE ALARM TOLERANCE".

eg

TOLERANCE	5%
-----------	----

 NOTE: 0% = No Alarm

Press 'CAL' again to set pressure hi alarm point (if used).

eg

PR HI	400KPA
-------	--------

 NOTE: 0 KPA = No Alarm

Press 'CAL' again to set Pressure Lo alarm point.

eg

PR LO	150 KPA
-------	---------

 NOTE: 0 KPA = No Alarm

NOTE:

Pressure alarm points will not be displayed if pressure option is off in fixed calibrations.

Press 'CAL' again to display clock setting option - follow section 2.6 or press any other key to escape calibration routine.

3.0 OPERATION

3.1 POWER ON / OFF KEY

Press the 'ON' / 'OFF' key for a full second to start spray monitor.

The display will start up confirming the monitor type, version number and standard or EC default mode.

Eg

SPRAY MONITOR

VERSION 3.2	EC MODE
-------------	---------

The version number relates to the current software installed in your monitor.

The display always reverts to "SPEED" after start up.

eg

SPEED	0.0 Kph
-------	---------

NOTE:

If "CHECK CAL" is displayed, then you must check all calibrations settings. See calibration procedure page 14.

If alarms are active, turn the master section control switch 'OFF' or disable alarms in the variable calibration options.

3.2 SPEED KEY

Press the 'SPEED' key once to display ground speed

eg

SPEED	14.6 Kph
-------	----------

Press the 'SPEED' key again to display current work rate expressed as hectares per hour.

eg

AREA	43.2 Ha/Hr
------	------------

If pressure sensor option used, then a special split screen function is available by pressing 'SPEED' key again.

eg

280 Kpa	5.2 Kph
---------	---------

3.3 TOTALS KEY

The 'TOTALS' key toggles between three functions.

TOTAL AREA

Press 'TOTAL' key once to display "TOTAL AREA" worked.

eg

TOT AREA	450 Ha
----------	--------

The "TOTAL AREA" can be "RESET" at the start of a spraying program and left to accumulate daily to keep track of overall areas worked.

To reset "TOTAL AREA" press 'RESET' key once to start reset process.

eg

RESET TOTAL ?

Press 'RESET' again to complete reset process or to abort reset process, press any other key to escape.

After reset of "TOTAL AREA" you will have the option to reset all "TRIP" memories 1 - 10 at the same time

eg

RESET ALL TRIPS ?

Press 'RESET' again to reset all trips or to abort reset process, press any other key to escape.

TOTAL DISTANCE

Press 'TOTAL' key again to display "TOTAL DISTANCE".

eg

DISTANCE	45.65 Km
----------	----------

To reset "DISTANCE" press 'RESET' key once to start reset process.

eg

RESET DISTANCE ?

Press 'RESET' again to complete reset process or to abort reset process, press any other key to escape.

The "TOTAL AREA" and "TOTAL DISTANCE" will stop accumulating whenever the monitor is 'ON HOLD'. See page 30.

TOTALS KEY con't**TANK LITRES**

Press 'TOTAL' again to display "TOTAL LITRES USED".

Eg

TANK	1825L USED
------	------------

To reset tank press 'RESET' key to clear 'TOTAL' after tank refilled.

TANK ALARM

NOTE: Based on tank volume calibration an alarm will activate when 100 Litres left.

eg

TANK	100L LEFT
------	-----------

ie: If tank vol calibration set for 2000 Litres then 'TANK ALARM' activates after 1900 Litres sprayed.

If tank used display is not reset after tank volume fully used then a reminder alarm will activate.

eg

RESET TANK ?

Press 'RESET' to instantly reset tank total

3.4 TRIP AREA KEY

The 'TRIP AREA' key allows the display of the sub total area for each of 10 separate plots or sections of land worked.

To display the current trip memory press 'TRIP AREA' key.

Eg

TRIP 1	56.2 HA
--------	---------

"TRIP 1" may be 'RESET' to zero at any time or kept as a record by changing to "TRIP 2", as explained below.

To reset trip memory press 'RESET' key to start reset process.

eg

RESET TRIP 1 ?

Press 'RESET' key again to complete reset process.

Eg

TRIP 1	0.00 HA
--------	---------

To change current trip memory press 'UP' or 'DOWN' key to change current trip number on display.

eg

TRIP 2	0.00 HA
--------	---------

NOTE : Previous trip records can be viewed or reactivated by using the 'UP' and 'DOWN' keys to change the current trip memory on display. Whichever trip number is displayed will be active when working.

The master section control can be used to stop the trip area meter by placing the monitor on 'HOLD' when travelling but not spraying.

eg

MONITOR ON HOLD

3.5 RATE KEY & WARNINGS

The 'RATE' key provides a split screen readout for "APPLICATION RATE" together with "SPEED", "FLOW RATE" and "PRESSURE" (if used).

Press the 'RATE' key to cycle through the choices. Application rate is always on the right hand side of the screen.

4.8 Kph	100 Lha
---------	---------

52 Lpm	100 Lha
--------	---------

280 Kpa	100 Lha
---------	---------

Whichever choice is displayed will remain the first choice whenever the 'RATE' key is pressed after having selected any other key.

RATE ALARM

Whenever the application rate varies either side of the preset **target** by more than the preset **tolerance %** then the alarm is activated and the display will automatically revert to your first choice "RATE" display, together with an operator prompt, regardless of any other functions that may have been selected.

eg

FASTER	68 LHA
--------	--------

This alarm will repeat at 5 second intervals until the application rate is restored to an acceptable tolerance or the monitor is placed on hold.

OPERATOR PROMPTS

SLOWER	if actual LHA is less than TARGET
FASTER	if actual LHA is greater than TARGET

The operator may adjust sprayer pressure or ground speed to compensate.

PRESSURE ALARMS

If pressure sensor option used, pressure "HI" and or "LO" alarm points may be set. See calibration procedure page 17.

Whenever sprayer pressure falls outside 'HI' / 'LO' limit points, the pressure alarm is activated on second priority to the rate alarm.

The pressure alarm prompt is displayed alternately on the left-hand screen.

eg

PR LO	100 Lha
-------	---------

120 KPA	100 Lha
---------	---------

The alarm will repeat at 5 second intervals until the pressure is restored to within the "HI" / "LO" limits or the monitor is placed on hold.

3.6 IMPERIAL / METRIC KEY

The 'IMPERIAL / METRIC' key toggles all display functions from one measuring system to the other.

eg

SPEED	10.0 Mph
-------	----------

SPEED	6.2 Kph
-------	---------

Imperial is UK imperial.

NOTE:

'IMP / MET' is not active in calibration setting. **All calibration factors must be metric.**

3.7 TIMER KEY

TIMER ALARM

An elapsed time alarm may be set to activate after the elapsed display counts up to a set point.

To set timer alarm press 'TIMER' key to display "SET TIMER".

Use 'UP' and 'DOWN' key to set duration of time to elapse before alarm will activate.

SET TIMER	00:00
	↑ ↑
	HOURS MINUTES

To start timer press 'TIMER' key to display "ELAPSED TIME" then press 'RESET' to start timer counting up from zero.

To cancel timer press 'TIMER' key to display "SET TIMER" then press 'RESET' to zero, timer alarm.

3.8 PRINT KEY

Using the optional printer, the 'PRINT' key allows you to print out various data relating to each individual trip recorded. In order for this data to be correct, the total & trip areas need to be reset before beginning a new program of spraying.

Press 'TOTAL' to display "TOTAL AREA".

eg

TOT AREA	54.6 HA
----------	---------

Press 'RESET' to start reset process.

eg

RESET TOTAL	?
-------------	---

Press 'RESET' again to clear 'TOTAL' and display "TRIP RESET" prompt

Eg

RESET ALL TRIPS	?
-----------------	---

Press 'RESET' again to reset all trips.

The spray monitor will start to accumulate spray data into the current active trip memory as you work.

The active trip number is displayed whenever you press the trip key

eg

TRIP 1	12.6HA
--------	--------

STARTING A NEW TRIP RECORD

When changing from one block to another and you wish to start a new record, first stop the tractor and make sure the monitor is 'ON HOLD'. This is done by switching the sprayer electric controls off.

PROCEDURE

1. Press the 'TRIP' key to display current trip.

eg

TRIP 1	13.5HA
--------	--------

2. Press 'UP' arrow key to activate next trip memory.

eg

TRIP 2	0.0HA
--------	-------

Now a new trip record will start the first time the sprayer electric controls are switched on again.

PRINTER OPERATION

The spray monitor will record the following spray data for each of up to 10 trips. A trip being one block or sub section of area sprayed.

FARMSCAN SPRAY DATA

TRIP 1

```

.....
DUR'H  1:44:14
TOTALS:
AREA    13.5HA
VOLUME  4876L
AVERAGES:
RATE    362.0LHA
SPEED   5.1KPH
PRESS   259KPA
    
```

TRIP 2

```

.....
DUR'H  1:49:58
TOTALS:
AREA    14.2HA
VOLUME  4375L
AVERAGES:
RATE    309.2LHA
SPEED   5.1KPH
PRESS   262KPA
    
```

TOTALS

```

AREA    27.7HA
VOLUME  9253L
    
```

- Space for the operator's name
- The number of hours and minutes spent spraying (ie Monitor OFF HOLD)
- The area covered when spraying
- The volume of liquid applied to that area.
- The average rate achieved
- The average speed of travel
- The average spray pressure (if used).

PRINTING

1. The printer connection tail hanging from the spray monitor rear panel has a weather proof plug to protect the connections when not in use.

! IMPORTANT: Replace weatherproof plug when not used.

2. Connect the printer to the spray monitor using the adaptor plug supplied.
3. The **red** power light on the printer should illuminate when the spray monitor is switched "ON".
4. Press 'SEL' key, on printer to bring the green printer light 'ON LINE' ready to print.
5. Press the spray Monitor 'PRINT' key to display the current trip for printing.

eg

PRINT TRIP 1?

6. Use the 'UP' / 'DOWN' keys to select any trip memory for printing or select "ALL TRIPS" if preferred.
7. Press 'PRINT' key again to start printout.

Multiple copies of the data may be produced by repeating the process after each copy is completed.

TO ADVANCE PAPER

1. Press 'SEL' key to switch green light "OFF".
2. Press 'LF' key to start paper advance.
3. Press 'LF' key again to stop paper advance.

PRINTER SELF TEST

1. Switch spray monitor power "OFF"
2. Hold down 'SEL' key on printer whilst switching spray monitor power on.

Printer will start immediately and print two lines of characters.

NOTE: If spray monitor can not communicate with printer then "NO PRINTER" will be displayed.

eg

NO PRINTER

Possible Causes.

- A) Printer not connected properly.
- B) Printer 'SEL' light 'OFF'.
- C) Printer cable fault.

3.9 CALIBRATION WARNING

The spray monitor keeps check that all your calibration settings remain constant.

In some instances a calibration factor could change without your knowledge, for example due to electrical interference.

When a corruption is detected, the monitor will beep continuously and the readout will display "CHECK CAL" warning.

eg

CHECK WHEEL CAL

Press the 'CAL' key and re-check all calibration factors, including the timer alarm calibration, which is accessed by pressing the 'TIMER' key.

3.10 MEMORY BACKUP

The monitor has a special internal back-up memory chip that keeps stored totals and calibration factors in memory even when the monitor is totally removed from the 12 volt D.C power source.

The internal memory chip has an expected life of 3 - 5 years.

When the memory chip fails, the unit will still function normally whilst the power switch is left on. If the memory has failed and you turn the power off, the calibration factors and totals will be erased. The "CHECK CAL" message will be displayed each time the monitor is switched 'ON'.

Return to the unit to your local dealer for replacement of the memory chip.

3.11 RUN HOLD FUNCTION

The run/hold function is activated when all sections are switched 'OFF'.

When the run / hold function is activated the unit is placed on 'HOLD' and the area meters, distance meters, elapsed timer, and all alarms will stop.

eg

MONITOR ON HOLD

A reminder will activate at 30 second intervals whilst the monitor is 'ON HOLD'.

When at least one section is activated again the unit will go 'OFF HOLD'.

eg

MONITOR OFF HOLD

3.12 TEST KEY FUNCTION

The 'TEST' key provides both a visual and audible indication of sensor operation and section input operation.

The 'TEST' function is used both to establish calibration factors (See section 2.1 & 2.2) and to check sensor functionality as explained in troubleshooting section of manual.

Press the 'TEST' key to display test wheel.

eg

TEST WHEEL	0
------------	---

The "TEST WHEEL" function should beep and count each time the wheel magnet sweeps past the wheel sensor.

Press 'TEST' key again to display "TEST FLO"

eg

TEST FLO	0
----------	---

The "TEST FLO" function will beep and count when the flow sensor turbine spins.

Press 'TEST' again to display "SECTION INPUTS" according to number of sections set up in fixed calibration

eg

TST SECTIONS	1234
--------------	------

Section numbers 1, 2, 3 & 4 will switch on or off when section switches are switched on or off.

Press 'TEST' again to display pressure sensor resistance reading.

eg

PRESS 180	Ohms
-----------	------

0 KPA	=	0 OHMS
260 KPA	=	100 OHMS
500 KPA	=	180 OHMS
OPEN CIRCUIT	=	200 OHMS
SHORT CIRCUIT	=	0 OHMS

3.13 FLOWSENSOR OPERATION AND TESTING

When the spray monitor is switched on, the red light on a Farmscan flow sensor indicates that power is reaching the flow sensor.

The green pulse light will flash when the turbine is turning. The rate of "flashing" will increase with higher flow rates, to the point where the green light will appear to be constantly "ON".

Before using the flow sensor with a tank of mixed chemicals, check the monitor is calibrated correctly, displaying the correct litre total.

See flow sensor factor calibration procedure in the instruction manual section 2.2.

FLOW SENSOR MAINTENANCE

1. Flush the flow sensor with fresh water after use every day.
2. Do not leave wettable powders in the spraylines overnight or for long periods.

! CAUTION !

FLOW SENSOR MUST BE THOROUGHLY DECONTAMINATED BEFORE PERFORMING ANY MAINTENANCE OF WETTED PARTS.

4.0 TROUBLESHOOTING 2300 SPRAY MONITOR SERIES 3

PROBLEM		POSSIBLE CAUSE / REMEDY
1.	NO POWER TO MONITOR WHEN ON / OFF KEY PRESSED	<p>a) Remove fuse from inline fuse holder and check using a multimeter or test light - Replace with 1 AMP 3 AG fuse only.</p> <p>b) Test voltage at power cable is 12 - 13.8V dc from battery.</p> <p>c) Check that red wire is to battery positive and black wire is to battery negative.</p> <p>d) Check that no other electrical device is connected to the same power cable.</p> <p>e) Unable to locate fault - Contact nearest Dealer or Authorised Service Agent.</p>
2	LCD DISPLAY DROPS OUT	a) Press 'ON / OFF' key for a full second to "Latch" startup process or follow Troubleshooting 3.
3.	GREY SQUARES APPEAR ON HALF THE READOUT OR MONITOR SWITCHES ITSELF OFF.	<p>a) If display rectifies when engine running this indicates battery in poor condition or dirty connections.</p> <p>b) If problem persists when engine running, then voltage supply is low or low current is problem due to poor connection at battery, corroded inline fuse holder in power cable, or other equipment connected to power cable.</p> <p>c) Clean battery terminals and power cable connections.</p> <p>d) Make sure power cable is <u>direct</u> to battery terminals.</p>
4.	"CHECK CAL" ON DISPLAY - INDICATES CALIBRATION FACTORS LOST FROM MEMORY.	<p>a) See Calibration warning instructions Section 3.9 in this manual.</p> <p>b) If problem occurs regularly, then it is probably caused by outside interference. See "Interference Causes and Remedies" Section 5</p> <p>c) Alternatively, CHECK CAL will be caused by failure of memory backup chip. In this case all calibrations will be lost from memory whenever the power switch is turned "OFF". See section 3.9 this manual.</p>
5.	LCD DISPLAY APPEARS SLOW TO CHANGE OR VERY BLACK	<p>a) Slow response is caused by cold conditions. This does not affect accuracy or warning systems. Display response will be faster at warmer temperatures.</p> <p>b) Black display is caused by high temperature > 60° Celsius. This will return to normal at lower temperatures.</p>
6.	SPEED READOUT TOO FAST OR TOO SLOW	a) Re check "WHEEL" Calibration is measured correctly and measured in Metres eg 2.445 metres.

TROUBLESHOOTING 2300 SPRAY MONITOR SERIES 3

PROBLEM	POSSIBLE CAUSE / REMEDY
7. SPEED READOUT JUMPY	<ul style="list-style-type: none"> a) Make sure magnet is facing sensor correctly as shown in section 1.5 "WHEEL SENSOR INSTALLATION". (Use of an alternative magnet may cause problems due to wrong orientation.) b) If two magnets used, problems could be uneven spacing of magnets. c) Check that Wheel Magnet is 15 - 20 mm away from Wheel Sensor as they pass. Magnet too close can cause jumpy speed. d) If readout is jumpy, it indicates that the impulses from the sensor are inconsistent. Check for poor or intermittent connection to sensors. e) Is the wheel loose? f) If fault can not be found, press Test key on monitor until "TEST WHEEL" is displayed. Drive slowly forward and listen to the beeps. The sound should be consistent and steady at a fixed speed. If the sound is jumpy, wiring is OK, then replace sensor. g) If magnets and sensor <u>not</u> aligned and beeps can be heard whilst stationary, then interference could be the cause. See Troubleshooting Section 5 "Interference Causes and Remedies".
8. SPEED READOUT STAYS AT ZERO	<ul style="list-style-type: none"> a) Check wheel calibration is set correctly - not zero. b) Check clearance between wheel magnet and sensor is 15 - 20mm. c) Press 'TEST' key to display "TEST WHEEL" then disconnect sensor at furthest point from monitor d) Use a short piece of wire or long nose pliers to make a short circuit across the pins corresponding to black and white wires of wheel sensor cable. e) If the monitor beeps with short circuit then monitor and wiring ok- replace sensor. f) If no response repeat short circuit test at draw bar connection back to monitor. If beep ok, then cable to sensor at fault. g) If still no response, short circuit across pins C and F of 6 way connector plug into monitor. If beep ok, then cable to draw bar at fault. h) If no response, return monitor to your nearest Farmscan dealer or authorised Farmscan service agent.

TROUBLESHOOTING 2300 SPRAY MONITOR SERIES 3

PROBLEM	POSSIBLE CAUSE / REMEDY
9. TOTAL AND TRIP AREA INCORRECT OR WON'T RECORD	<p>a) Check "SPEED" readout is correct and steady - if not, this will affect the area totals. See Troubleshooting Section 5, 6 or 7</p> <p>b) Recheck width calibration is set correctly in <u>metres</u>.</p> <p>c) Is the machine overlapping or over counting headlands.</p> <p>d) Activate the 'RUN/HOLD' function by switching the sections on to make certain monitor is "OFF HOLD"</p> <p>e) If master section 'RUN / HOLD' used, then unplug section Input plug and monitor should go "OFF HOLD"</p> <p>f) If monitor goes 'OFF HOLD', then fault with section wiring.</p>
10 NO RATE READOUT	<p>a) Check 'SPEED' readout, if no speed follow Troubleshooting 5, 6, or 7.</p> <p>b) Check correct calibration of widths and number of sections. See 2.4</p> <p>c) Check flow PPL setting correct. See 2.2</p> <p>d) Press 'TEST' key and check "TEST FLO" response should beep and count rhythmically when turbine turning.</p> <p>e) Check flow sensor red light is ON and green light is flashing when liquid flows. If OK proceed to (f) otherwise see trouble shooting 11 & 12.</p> <p>f) Disconnect flow sensor from main loom and press 'TEST' key on monitor to display "TEST FLO".</p> <p>Use a pair of long nosed pliers to intermittently short out across pins A (white) and B (black) of flow sensor loom connector plug back to monitor.</p> <p>DO NOT TOUCH PIN C RED! + 12 Volts</p> <p>Monitor flow test should beep and count when short circuited.</p> <p>If beep OK follow Troubleshooting 11</p> <p>If no response repeat test across pins B & D of 6 way sensor connector plug direct into monitor.</p> <p>If still no response direct into monitor then return monitor for service.</p>

TROUBLESHOOTING 2300 SPRAY MONITOR SERIES 3

PROBLEM		POSSIBLE CAUSE / REMEDY
11	WHEEL SENSOR TEST PROCEDURE	<p><u>DO NOT</u> TEST WHEEL SENSOR WITH A TEST LIGHT, USE A MULTIMETER ONLY.</p> <p>a) Disconnect wheel sensor from cable.</p> <p>b) Switch Multimeter "ON" and select "OHMS" scale.</p> <p>c) Touch test probes together and meter needle should swing to right of scale indicating "0" OHMS resistance. (If digital meter display - should read zero).</p> <p>d) Move wheel sensor magnet away from sensor and connect test probes to wheel sensor pins. If meter goes to zero, then sensor is short circuit (faulty). If the meter stays to the left of scale, move wheel magnet in front of sensor, meter should go straight to zero. If meter fails to change, then sensor is open circuit. (faulty)</p>
12	RED LIGHT ON FLOWSENSOR FAILS	<p>a) Check that monitor is switched 'ON'.</p> <p>b) Check connection of plug into monitor.</p> <p>c) Check voltage across pin D & E at monitor is 12 - 14V DC</p> <p>d) Check voltage into flow sensor is 12 - 14 volts between red and black wires at flow sensor connector plug of loom. If voltage OK, and sensor still fails, return sensor to your nearest Farmscan dealer or authorised service agent.</p>
13.	GREEN LIGHT FAILS TO FLASH	<p>a) Check red light is ON, if No red Light follow Troubleshooting Section 11-</p> <p>b) Disconnect flow sensor from sprayline and check Inlet strainer for blockage.</p> <p>c) Blow softly into Inlet (without mouth contact) and check that turbine spins freely.</p> <p>d) If turbine jammed or light does not flash then use removal tool to disassemble flow sensor.</p> <p>e) Inspect magnets (2x) embedded in turbine for build up of metal particles, which may cause failure.</p> <p>f) Use toothbrush and soapy water to scrub magnets clean and reassemble turbine, taking note of flow direction. Firmly tighten retaining ring and blow softly into inlet to check turbine spins freely.</p> <p>g) If unable to locate fault, return flow sensor to your nearest Farmscan dealer, authorised service agent.</p>

TROUBLESHOOTING 2300 SPRAY MONITOR SERIES 3

PROBLEM		POSSIBLE CAUSE / REMEDY
14.	FLOW READING INACCURATE	<p>a) Follow Flow PPL Calibration Procedure 2.2 in manual to make sure flow calibration factor is set correctly.</p> <p>b) If using a diaphragm or piston pump make sure pulsation dampener works properly - excess hammering may cause false readings.</p> <p>c) Disassemble Flow sensor turbine and clean or replace see troubleshooting 12</p>
15	PRESSURE SENSOR WON'T READ OR READS FULL SCALE OR ZERO CONSTANTLY	<p>a) Check monitor calibration set up to see the pressure sensor is set correctly ie "OFF" (if not used) or 500 KPA or 25 BAR, depending on pressure sensor type.</p> <p>b) Press 'TEST' key to display 'TEST' pressure readout. See 'TEST' key function 3.12</p> <p>c) Short out terminals of pressure sensor and if readout drops to zero then pressure sensor is faulty.</p> <p>d) If readout stays high, then is open circuit to Pins A & D. cable or monitor itself.</p>
16	UNABLE TO LOCATE FAULT	<p>a) Contact nearest Farmscan Dealer</p> <p>b) Contact Computronics Corporation Ltd 6 Sarich Way Technology Park Bentley Western Australia 6102</p> <p>PH: +61 8 9470 1177 FAX: +61 8 9470 2844 EMAIL: service@farmscan.net.au</p>

5.0 INTERFERENCE CAUSES AND REMEDIES

CAUSES	REMEDIES
Noisy wire ignition leads on petrol engine or pump motor.	Replace with Carbon leads. Fit suppressors to coil and distributor.
Faulty Alternator	Exchange it
Other electrical equipment running off monitor power cable	Run separate power cable DIRECT to 12V battery for Monitor.
Calibrations get corrupted when solenoids / clutch switched off.	Make sure Monitor has its own separate Power Cable direct to 12V Battery. Fit diode across solenoid coil / clutch to clamp spike. Run power cable Physically away from solenoid / clutch wiring.
2 Way Radio interferes with monitor	<p>Move monitor away from radio or shield monitor from radio with aluminum foil connected to chassis or install monitor in metal box.</p> <p>Connect monitor to different battery - if problem goes away fit power cable suppressor.</p>
Monitor upsets FM radio	<p>Boost aerial signal to radio - shield monitor from radio using aluminum foil wrapped around monitor and connected to chassis.</p> <p>Move monitor further away from radio.</p>

6.0 WIRING LOOM DETAILS

