

rate monitor 1550

rate monitor **1550**

Installation and Operation  
Instructions

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## PARTS LIST

REF	PART NO.	DESCRIPTION	QTY
1	A-1550	RATE MONITOR	1
2	AA-121P	FLOW SENSOR (2-90LPM)	1
3	AA-133	MINI WHEEL MAGNET & NUT	2
4	AC-101F	8m POWER CABLE (fused)	1
5	AA-110C	REED SENSOR	1
6	AC-205	2 WAY 5m EXTENSION CABLE	1
7	AC-305	3 WAY 5m EXTENSION CABLE	1
8	AH-408	UNIVERSAL HARDWARE PACK	1
9	AH-504	MOUNTING BRACKET	1
10	AH-504MP	MOUNTING BRACKET PLATE	1
11	HG-706	CABLE TIES	1
12	HS-1/412	MOUNTING BRACKET SCREW	2
13	HS-10X3/4SS	MOUNTING SCREW	2
14	HW-1/4S	STAR WASHER	2
15	AM-1550	1550 RATE MONITOR MANUAL	1
16	AM-200	WARRANTY CARD	1

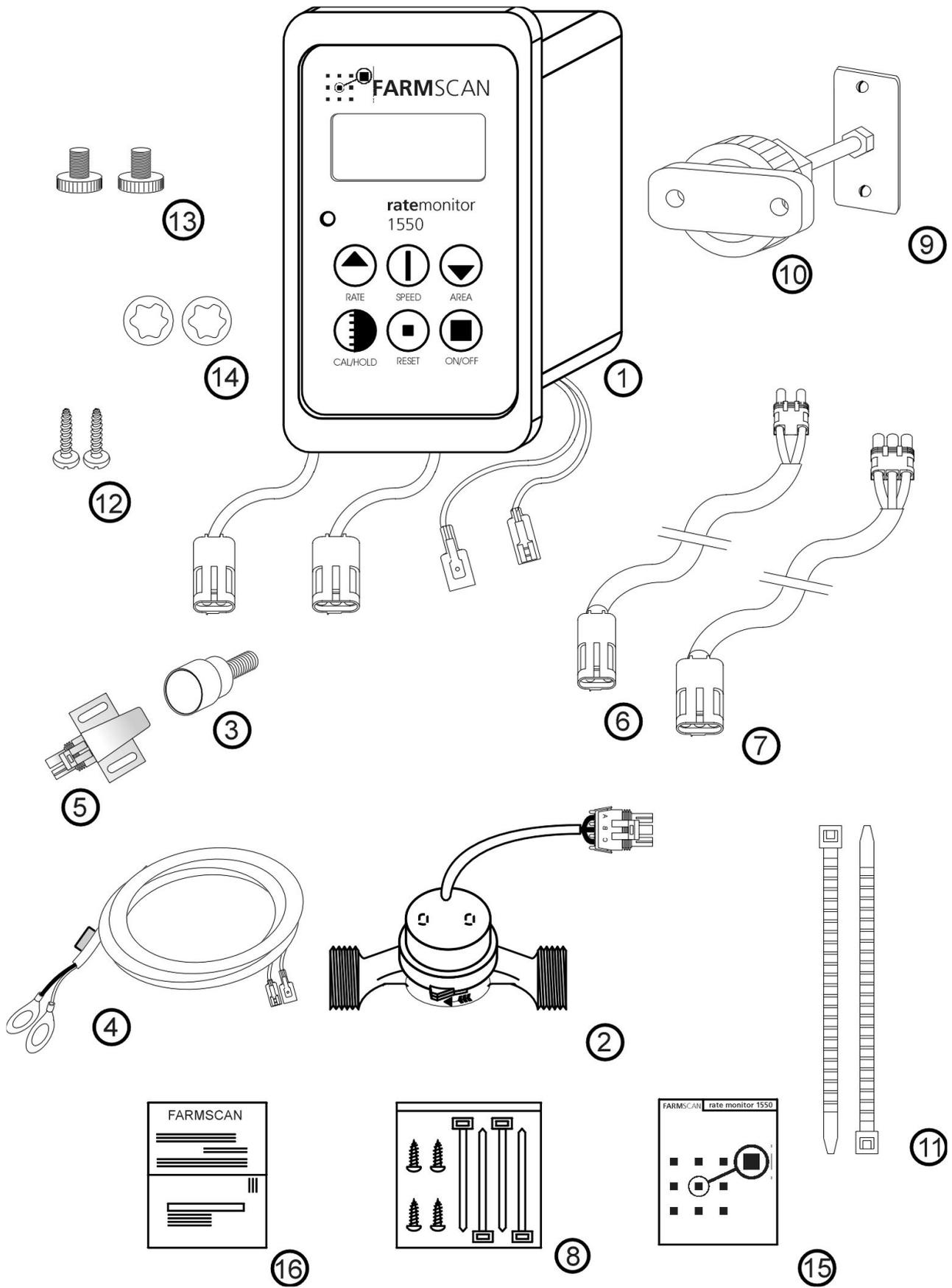
## OPTIONAL SENSORS

PART NO.	DESCRIPTION
AA-125	FLOW SENSOR (1-18LPM)
AA-230	50Bar 10-100l/min Flow sensor 1"
AA-232	40Bar 35-350l/min Flow sensor 2"

## OPTIONAL CABLES

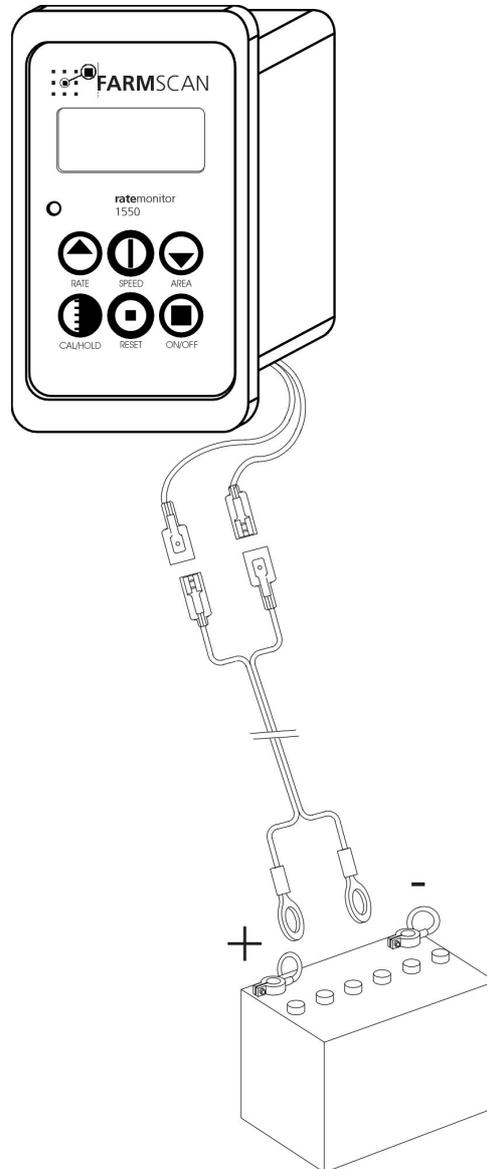
PART NO.	DESCRIPTION OF KIT
AC-205	5m 2 WAY EXTENSION CABLE
AC-305	5m 3 WAY EXTENSION CABLE
AC-210	10m 2 WAY EXTENSION CABLE
AC-310	10m 3 WAY EXTENSION CABLE

# PARTS PICTORIAL - 1550 RATE MONITOR



# 1.0 INSTALLATION

## 1.1 POWER CONNECTION



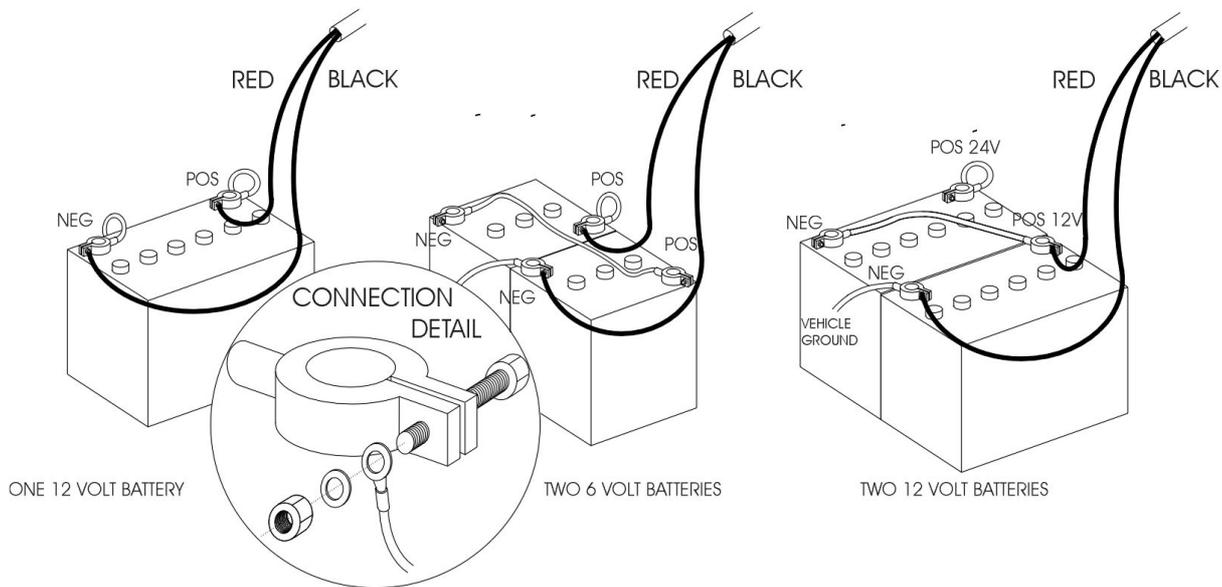
Use cable ties to secure Power cable away from risk of damage

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

**DISCONNECT MONITOR POWER CABLE WHEN ARC WELDING ON MACHINERY.**

**SEE NEXT PAGE TO CONNECT TO BATTERY.**

## TYPICAL BATTERY HOOK-UPS



## 1.2 SENSOR & WIRING INSTALLATION

Install flow sensor and wheel sensor first, then lay out both wheel and flow sensor wiring looms on machine.

Secure both looms neatly to machinery framework with cable ties to avoid risk of damage.

Optional 5m and 10m loom extension cables are available if required (look at optional parts).

The 2 way 5m loom connects directly from the wheel sensor input tail on the rate monitor to the wheel sensor and the 3 way 5m loom connects directly from the flow sensor input tail on the rate monitor to the flow sensor.

## 1.3 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 servicing.

If using the standard flow sensor supplied, 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. Look under "OPTIONAL SENSORS" on page 2.

Check minimum & maximum L/MIN as follows:

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

Example:

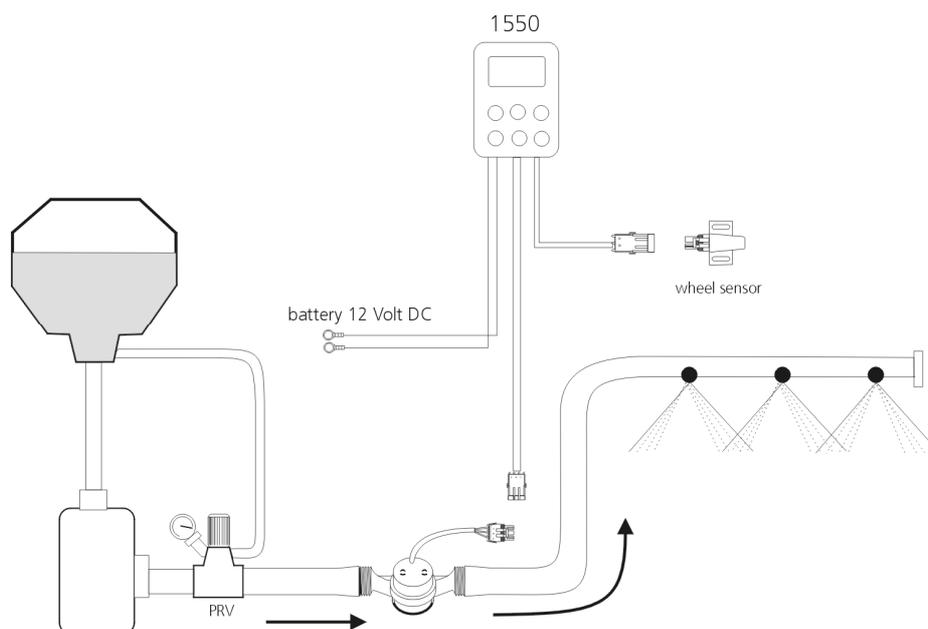
$$\frac{300 \text{ L/HA} \times 4 \text{ M} \times 4 \text{ KPH}}{600} = 8 \text{ L/MIN}$$

Before installing the flow sensor, blow softly into the inlet side and check that the turbine spins freely. If using the standard flow sensor's, the 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.



## 1.4 WHEEL SENSOR INSTALLATION

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

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.

If fitting both wheel magnets, ensure that they are exactly opposite to achieve the same interval between pulses.

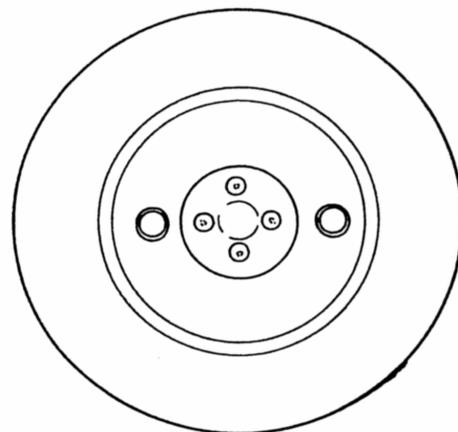
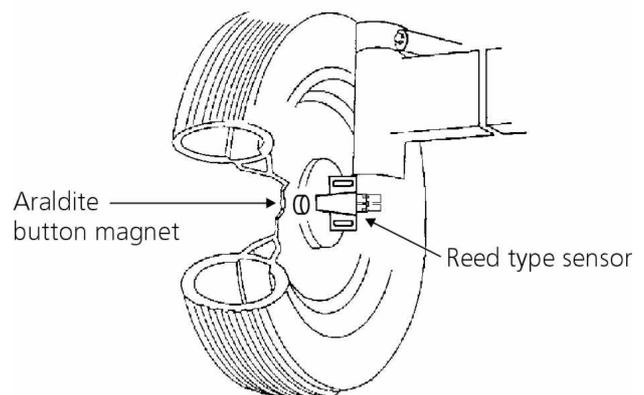
Magnets can be mounted anywhere in a radius from centre of the wheel. Nearer to the hub will ensure the best ground clearance.

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 the wheel sensor loom, and use cable ties to secure cable away from potential damage. Allow enough slack for axle movement and steering.

**NOTE: magnet** may be removed from housing and glued onto wheel using Araldite.



# CALIBRATION

Before operating the rate 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 sections 2.1 and 2.2.

By pressing and holding the 'CAL/HOLD' key you can go into the calibration menu.

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

Use the 'UP' and 'DOWN' arrow keys to change a calibration number (factor) or setup on display.

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

If you wish to step back to a previous calibration option, you must keep pressing the 'CAL/HOLD' key to exit the calibration menu and then press and hold the 'CAL/HOLD' key and get back into the calibration menu from the beginning.

## CALIBRATION WARNING

If calibration factors are corrupted the readout will display HELP to indicate that calibration factors must be checked.

## 2.1 WHEEL FACTOR CALCULATION

### DISTANCE MEASUREMENT PROCEDURE (WHEEL SENSOR) - ONE WHEEL MAGNET

1. Align the wheel magnet and sensor
2. Mark bottom centre of tyre on which the sensor is fitted and peg ground in corresponding position
3. Move slowly forward and stop on exactly 10 tyre rotations.
4. Measure overall distance travelled and divide by 10 to get an average.

Example:

$$\begin{array}{rcl} 10 \text{ TURNS} & = & 23.45 \text{ METRES} \\ 23.45 \div 10 & = & 2.345 \text{ METRES / TURN} \end{array}$$

Therefore distance calibration factor = 2.345 metres

### DISTANCE MEASUREMENT PROCEDURE (SHAFT SENSOR) – ONE SHAFT MAGNET

1. Align the shaft magnet and the sensor.
2. Peg the ground at the base of any tractor or implement wheel.
3. Move slowly forward and count exactly 10 rotations of the shaft.
4. Peg the ground again, at the base of the same wheel and measure the distance travelled. Divide the distance travelled by 10 to get an average.

Example:

$$\begin{array}{rcl} 10 \text{ TURNS} & = & 23.45 \text{ METRES} \\ 23.45 \div 10 & = & 2.345 \text{ METRES / TURN} \end{array}$$

Therefore distance calibration factor = 2.345 metres.

#### NOTE:

If using two wheel or shaft magnets you must remember that one rotation of either the wheel or shaft will mean that the sensor has been activated twice. Calculate as follows:

$$\begin{array}{rcl} 10 \text{ TURNS} & = & 20 \text{ sensor pulses} & = & 23.45 \text{ m} \\ 23.45 \div 20 & = & 1.172 \end{array}$$

Therefore distance calibration factor = 1.172 m

## 2.2 FLOWSENSOR FACTOR CALCULATION

The AA-121P Farmscan 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 it is advised to check this figure before spraying chemicals.

### IMPORTANT:

Disconnect a hose after the flow sensor that can be directed into a bucket. Preferably after a solenoid valve or another valve that can be used easily to stop and start the test. Follow the procedure below to test the flow sensors calibration factor.

### FLOWSENSOR TEST METHOD

! WARNING - TAKE PRECAUTION TO AVOID SPLASHBACK INJURY

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

1. Fully prime the flow sensor and hose before starting.
2. Prepare a container of known volume 10 Litres or more with accurate markings, or check quantity in a smaller measure jug.
3. Switch monitor on and press and hold the "CAL/HOLD" key to display H1 and keep pressing the "CAL/HOLD" key to display H5. 'RESET' to clear any figure on display.

Example:

H5

4. Start liquid flow into container and shut off flow exactly at desired point. The figure under H5 should immediately stop counting.

Example:

912

### IMPORTANT !

H5 count will scroll from 0 to 9999. If you exceed 9999 pulses the display will start from 0 and count up again. Watch the pulse count carefully and add 9999 to the present pulse count to get the total pulses if the pulse count exceeds 9999.

Divide the total pulses by the measured quantity.

$$\begin{array}{rcl}
 \text{eg} & \text{PULSES} & = & 485 \\
 & \text{LITRES} = & = & 10.5 \\
 & 485 \div 10.5 & = & 46.2 \text{ Pulses Per Litre}
 \end{array}$$

flow test method continued...

5. Repeat test a couple of times to check accuracy then record factor flow cal factor in H3 setting as explained in section 2.3.

## 2.3 ENTERING CALIBRATION FACTORS

1. Switch rate monitor ON and press and hold the CAL/HOLD key to display H1 (Distance calibration factor)

Example:

H1 0.500

2. Use UP or DOWN arrow keys to set distance factor in metres.

Example:

2.345

3. Press the CAL/HOLD key again to display H2 (Width calibration factor)

Example:

H2 06.00

4. Measure effective implement WIDTH in metres and use UP and DOWN keys to set width factor.

Example:

04.00

5. Press the CAL/HOLD key again to display H3 (Flow Calibration Factor)

Example:

H3 40.00

6. Use the UP or DOWN arrow keys to set the FLOW CALIBRATION FACTOR.

Example:

45.6

7. Press the CAL/HOLD key again to display H4 (Flow rate selection).
8. Use the UP or DOWN arrow keys to set the monitor up to display either Litre per Hectare (LH) or Litres per Minute (LM).
9. Press the CAL/HOLD key again to display H5. This is used to check flow pulses. This is used when testing your flow sensors calibration.
10. Press the CAL/HOLD key again to get you out of the calibration menu back into operate mode.

## 3.0 OPERATION

### 3.1 POWER ON / OFF KEY

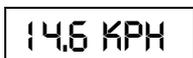
Press and hold the 'ON' / 'OFF' key for a full second to switch on rate monitor. Whenever the unit is switched on the rate reading will be displayed first.

From this point you can select any other key.

### 3.2 SPEED KEY

Press the 'SPEED' key once to display ground speed

Example:



14.5 KPH

### 3.3 AREA KEY

Displays the total hectares which can be reset at any time. Maximum total reading is 9999

### 3.4 RATE KEY

Displays the actual rate being sprayed. It may be in Litre per Hectare or Litre per Minute depending on what H4 in the calibration mode has been set up to.

### 3.5 RESET KEY

After selecting AREA, holding the RESET key down for approx. 3 seconds will clear the readout back to zero.

The RESET key can also be used to clear calibration factors to zero.

### 3.6 MEMORY BACKUP

The total area reading is automatically stored in permanent memory every 6 minutes of operation or when the unit is switched OFF using the ON/OFF key.

The inbuilt memory system will hold all calibrations and area in memory for at least 1 month after disconnection from the 12 Volt power source.

### 3.7 RUN HOLD FUNCTION

You can automatically put the monitor on hold by pressing the CAL/HOLD once. A red LED will be on to indicate that the monitor is now on hold and AREA will stop accumulating.

Pressing the CAL/HOLD key again will put the monitor off hold and the red LED will switch off.

### 3.8 FLOW SENSOR OPERATION AND TESTING

When the rate 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".

#### 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 1550 RATE MONITOR

PROBLEM	POSSIBLE CAUSE / REMEDY
1. NO POWER TO MONITOR WHEN ON / OFF KEY PRESSED	a) Remove fuse from inline fuse holder and check using a multimeter or test light - Replace with 1 AMP 3 AG fuse only. b) Test voltage at power cable is 12 - 13.8V dc from battery. c) Check that <b>red</b> wire is to battery positive and <b>black</b> wire is to battery negative. d) Check that no other electrical device is connected to the same power cable. e) Unable to locate fault - Contact nearest Dealer or Authorised Service Agent.
2. LCD DISPLAY DROPS OUT	a) Press 'ON / OFF' key for a full second to "Latch" startup process or follow Troubleshooting 3.
3. MONITOR SWITCHES ITSELF OFF.	a) If display rectifies when engine running this indicates battery in poor condition or dirty connections. 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. c) Clean battery terminals and power cable connections. d) Make sure power cable is <u>direct</u> to battery terminals.
4. SPEED READOUT TOO FAST OR TOO SLOW	a) Re check "WHEEL" Calibration is measured correctly and measured in Metres eg 2.445 metres.
5. SPEED READOUT JUMPY	a) Make sure magnet is facing sensor correctly as shown in section 1.4 "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 sensor. e) Is the wheel loose? f) Is the magnet staying in line with sensor on corners?

## TROUBLESHOOTING 1550 RATE MONITOR

PROBLEM	POSSIBLE CAUSE / REMEDY
6. SPEED READOUT STAYS AT ZERO	<p>a) Check wheel calibration is set correctly - not zero.</p> <p>b) Check clearance between wheel magnet and sensor is 15 - 20mm.</p> <p>c) Press 'SPEED' key to display ground speed then disconnect sensor at furthest point from monitor</p> <p>d) Use a short piece of wire or long nose pliers to intermittently short circuit pins corresponding to black and white wires of wheel sensor cable.</p> <p>e) If the monitor displays a speed the wiring is ok- replace sensor.</p> <p>f) If no response repeat short circuit test at the monitor. If a speed is displayed then the fault is in the cable.</p> <p>g) If no response, return monitor to your nearest Farmscan dealer or authorised Farmscan service agent.</p>
7. WHEEL SENSOR TEST PROCEDURE	<p><b>DO NOT TEST WHEEL SENSOR WITH A TEST LIGHT, USE A MULTIMETER ONLY.</b></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>

## TROUBLESHOOTING 1550 RATE MONITOR

PROBLEM		POSSIBLE CAUSE / REMEDY
8.	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 4, 5 or 6</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) Is the monitor off HOLD?</p>
9.	NO RATE READOUT	<p>a) Check 'SPEED' readout, if no speed follow Troubleshooting 6 &amp; 7.</p> <p>b) Check correct calibration of width. See 2.3.</p> <p>c) Check flow cal setting is correct in H3. See section 2.2 &amp; 2.3.</p> <p>d) If using standard flow sensor check that the <b>red</b> light is ON and green light is flashing when liquid flows. If OK proceed to (e) otherwise see trouble shooting 10, 11 &amp; 12.</p> <p>e) Disconnect flow sensor from main loom and set up monitor to display Litres per minute. H4 needs to be set up so monitor displays a litre per minute reading.</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 should show a litres per minute reading.</p> <p>If OK follow Troubleshooting 11</p> <p>If no response repeat test at directly at the monitor on pin A (white) and pin B (black). If Litre per minute displayed then the fault is in the cable.</p> <p>If still no response direct into monitor then return monitor for service.</p>

## TROUBLESHOOTING 1550 RATE MONITOR

PROBLEM		POSSIBLE CAUSE / REMEDY
10. RED LIGHT ON FLOWSENSOR FAILS (Using standard flow sensor)	<ul style="list-style-type: none"> <li>a)</li> <li>b)</li> <li>c)</li> <li>d)</li> </ul>	<ul style="list-style-type: none"> <li>a) Check that monitor is switched 'ON'.</li> <li>b) Check connection of plug into monitor.</li> <li>c) Check voltage across pin C &amp; B on 3 pin flow sensor input plug at monitor is 12 - 14V DC (C=red and B=black).</li> <li>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.</li> </ul>
11. GREEN LIGHT FAILS TO FLASH (Using standard flow sensor)	<ul style="list-style-type: none"> <li>a)</li> <li>b)</li> <li>c)</li> <li>d)</li> <li>e)</li> </ul>	<ul style="list-style-type: none"> <li>a) Check red light is ON, if No red Light follow Troubleshooting Section 10.</li> <li>b) Disconnect flow sensor from sprayline and check Inlet strainer for blockage.</li> <li>c) Blow softly into Inlet (without mouth contact) and check that turbine spins freely.</li> <li>d) If turbine jammed or light does not flash then flow sensor needs servicing.</li> <li>e) Return flow sensor to your nearest Farmscan dealer, authorised service agent.</li> </ul>
12. FLOW READING INACCURATE	<ul style="list-style-type: none"> <li>a)</li> <li>b)</li> </ul>	<ul style="list-style-type: none"> <li>a) Follow Flow Calibration Procedure in manual to make sure flow calibration factor is set correctly.</li> <li>b) If using a diaphragm or piston pump make sure pulsation dampener works properly - excess hammering may cause false readings.</li> </ul>
13. UNABLE TO LOCATE FAULT	<ul style="list-style-type: none"> <li>a)</li> <li>b)</li> </ul>	<ul style="list-style-type: none"> <li>a) Contact nearest Farmscan Dealer</li> <li>b) Contact Computronics Corporation Ltd 6 Sarich Way Technology Park Bently Western Australia 6102  PH: +61 8 9470 1177 FAX: +61 8 9470 2844 EMAIL: <a href="mailto:service@farmscan.net.au">service@farmscan.net.au</a></li> </ul>

## 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.