

## **Electro-Magnetic Compatibility (EMC)**



This product complies with Council Directive 89/336/EEC when installed and used in accordance with the relevant instructions.

### **Service and Technical Support**

PLEASE CONTACT YOUR LOCAL DISTRIBUTOR

If unknown then fax: 44 (0) 1453 733311

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Our policy is one of continuous improvement and the information in this document is subject to change without notice. Check that the software reference matches that displayed by the instrument.

**Document number**

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# **User Guide.**

## **Work Measurement Instruments**

### **General Installation**

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# Overview

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This installation manual covers most of the RDS "Wizard" type and "UDM" type "Work Measurement" instruments, their associated sensors and wiring. Not everything in the manual will be relevant to the instrument being installed. There are individual kits for the sensors, power supply and head unit mounting.

Some installations may require specific components or sensors on the vehicle or implement which are not covered in this manual. In these cases refer to the separate instruction leaflet provided with the individual kits.

The reliability of the system is very dependent on the standard of installation. The kits should be suitable for the vast majority of installations and enable a neat and tidy job to be made. If you are unsure of any aspect of the installation please contact your RDS agent or distributor, or contact RDS directly.

## ***Important safety precautions !***

In addition to observing site safety requirements, before working on the machine or implement, always :-



**If working on a hydraulic system, ensure that any lifting attachment is lowered onto the ground and all pressure is released, before slackening off any hydraulic coupling.**



**Prevent the machine from being accidentally started or otherwise powered up, or being moved while working on it e.g. remove the ignition key, chock wheels, place a warning notice in the cab etc.**



**Keep other persons in the vicinity of the machine fully aware of your immediate intentions during installation and initial calibration.**

# 1 - Installing the Head Unit

## 1.1 "Wizard" Head Unit

Confirm with the machine operator on where to mount the head unit in the cab. The head unit must not restrict the view out of the cab, nor impede the use of the controls.

The head unit is fitted with a 1 metre flying lead terminating with an 18-way IDC type connector, ready for connection into the "Terminator" junction box.

### 1.1.1 Mounting the Head Unit

The head unit is supplied with a separate mounting kit comprising the following parts :

- 1 x Long Bracket
- 1 x Short Bracket
- 3 x Clamping Knobs
- 1 x Cover Plate
- 1 x Mounting Plate
- 2 x Self Tapping Screws

1. Snap the cover plate into the recess of the long bracket (it only fits one way).
2. The instrument mount is designed to offer maximum flexibility in positioning the head unit, either from the right hand side of the cab, from the dashboard or from an overhead position.

Assemble the two brackets, and mounting plate with clamping knobs, and attach to the head unit.

*NOTE: Either the long or short bracket can be attached to the head unit, whichever gives the most suitable orientation.*



# 1 - Installing the Head Unit

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As you will notice, you can index each pivot point on the mounting bracket to angle the head unit in relation to the mounting plate.

4. Having established the orientation for the bracket, fix the mounting plate to the cab with the self tapping screws provided.



**Do not drill into a ROPS or FOPS frame.**

If you are fixing the mounting plate to plastic e.g. the dashboard or other cab moulding, it is recommended to use M4 screws with mudwing washers to strengthen the mounting point.



**Do not attempt to adjust the mounting bracket assembly without first slackening off the clamping knobs sufficiently. You will only succeed in damaging the bracket otherwise.**

## 1.1.2 Panel Mounting

Follow the instructions printed on the paper template provided in the optional panel mounting kit.

# 1 - Installing the Head Unit

## 1.2 "UDM" Head Unit

The head unit consists of an inner pod and an outer pod with the mounting bracket.

The outer pod can be rotated to allow the head unit to be mounted in different orientations (fig. 1b).

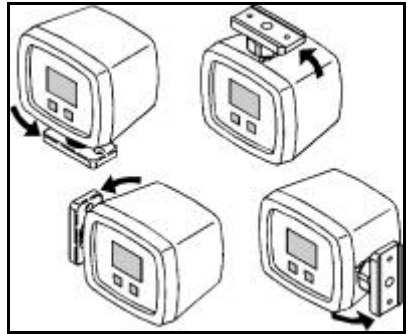


Fig. 1b - Mounting positions

To re-position the mounting bracket, remove the rear screw and withdraw the outer pod (fig.1c).

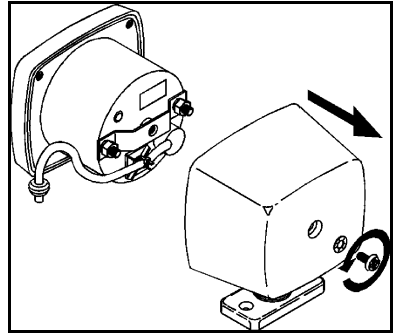


Fig. 1c - Remove outer pod

Rotate the pod to the required position for either left hand pillar, right hand pillar or overhead mounting.

Re-position the cable around the innerpod and replace the outer pod, taking care that the cable grommet is properly located (fig. 1d).

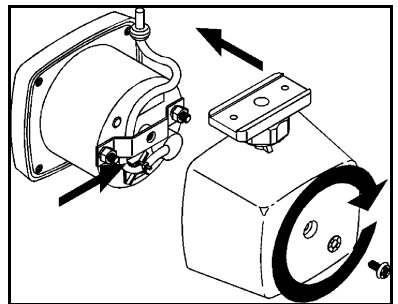


Fig. 1d - Rotate outer pod

# 1 - Installing the Head Unit



Fix the pod mounting plate with the self-tapping screws provided (fig. 1e).

**Do not drill into a ROPS or FOPS frame.**

If you are fixing the mounting plate to plastic e.g. the dashboard or other cab moulding, it is recommended to use M4 screws with mudwing washers to strengthen the mounting point.

Hand-tighten the clamping nut to lock the head unit in position.

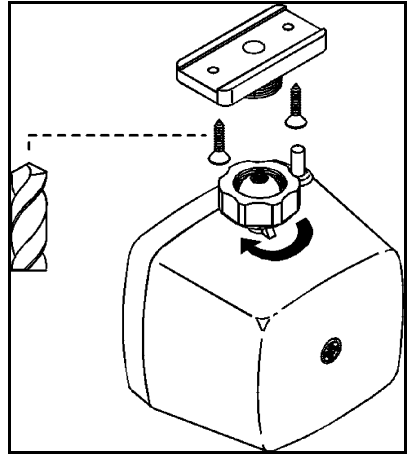


Fig. 1e - Attach mounting plate

## 1.2.1 Panel Mounting

The UDM can be panel mounted (fig. 1f).

This requires the optional kit ref. K/PNL/MNTD

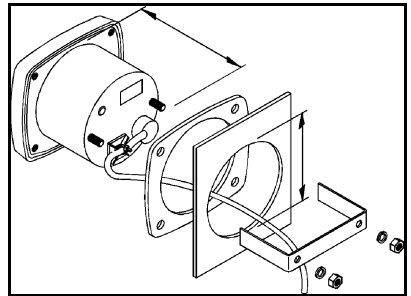
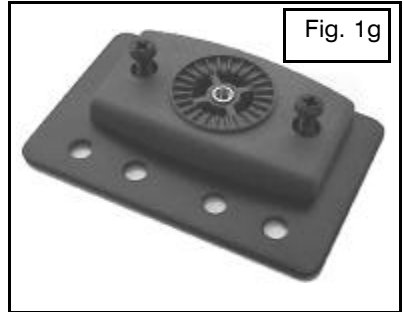


Fig. 1f - Panel mounting

# 1 - Installing the Head Unit

## 1.3 Mounting on an ATV

The kit ATV/SNR/KIT includes a rectangular mounting plate and bolts for fitting the head unit to the handlebars (fig. 1g).

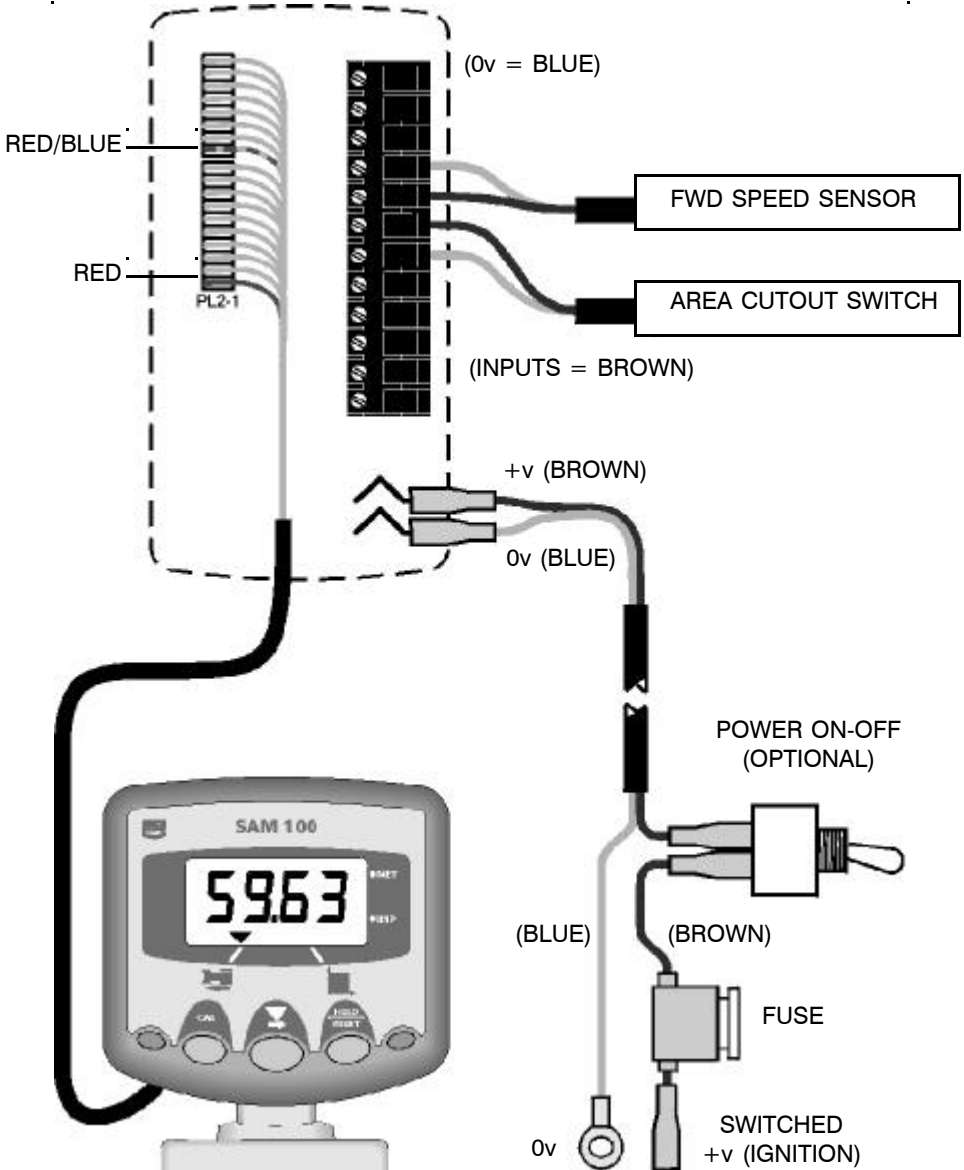


### 1.3.1 Honda ATV's

1. Ease the moulded rubber "Honda" nameplate out of the central handlebar cover, and remove the two M6 fixing bolts.
2. Install the rectangular mounting plate using the two longer bolts supplied. Tighten the bolts and replace the Honda nameplate to cover the boltheads.
3. Fix the plastic mounting plate to the rectangular mounting plate using the self tapping screws provided. Assemble and adjust the head unit bracket assembly as described in section 1.1.1

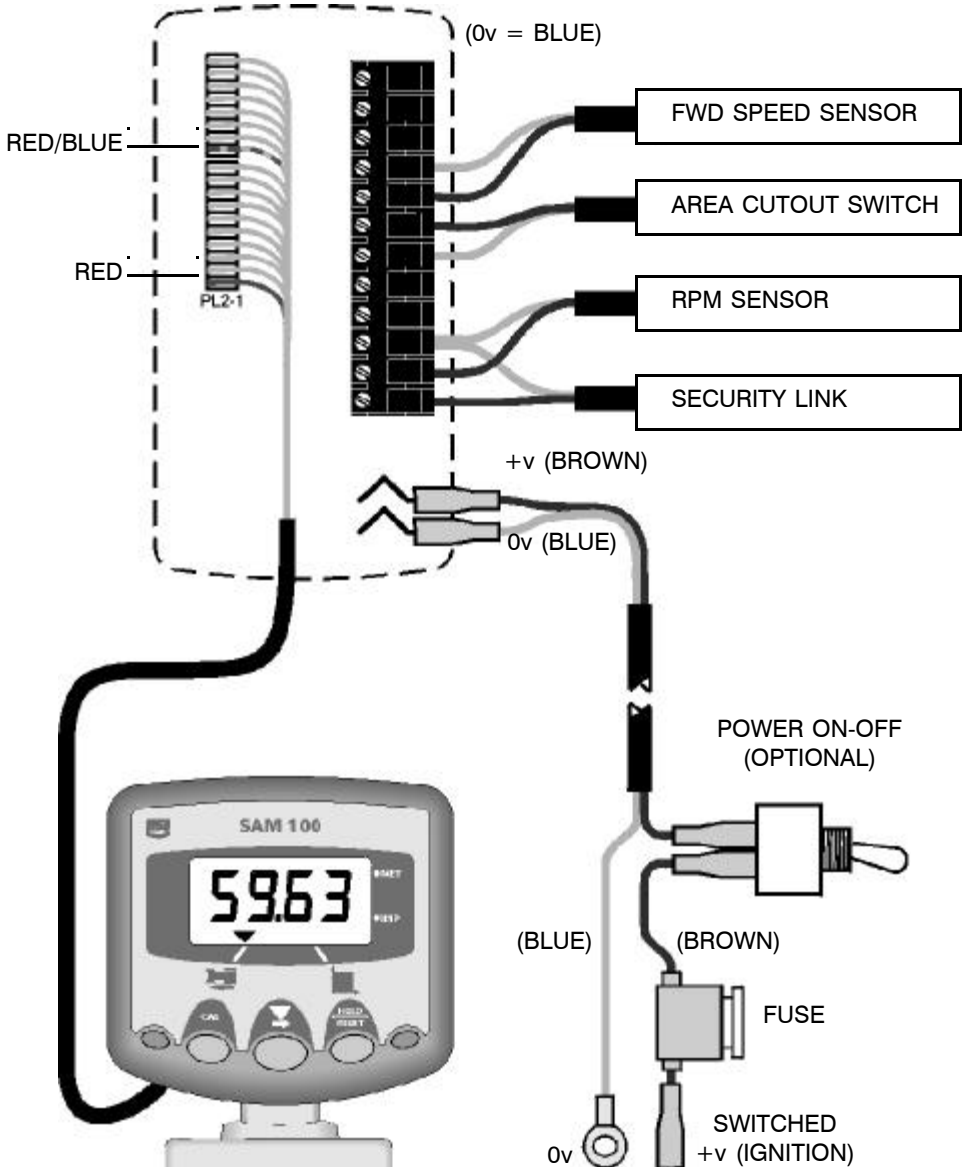
## 2 - Wiring

### SAM 100 (Replaces "Jubilee 1")



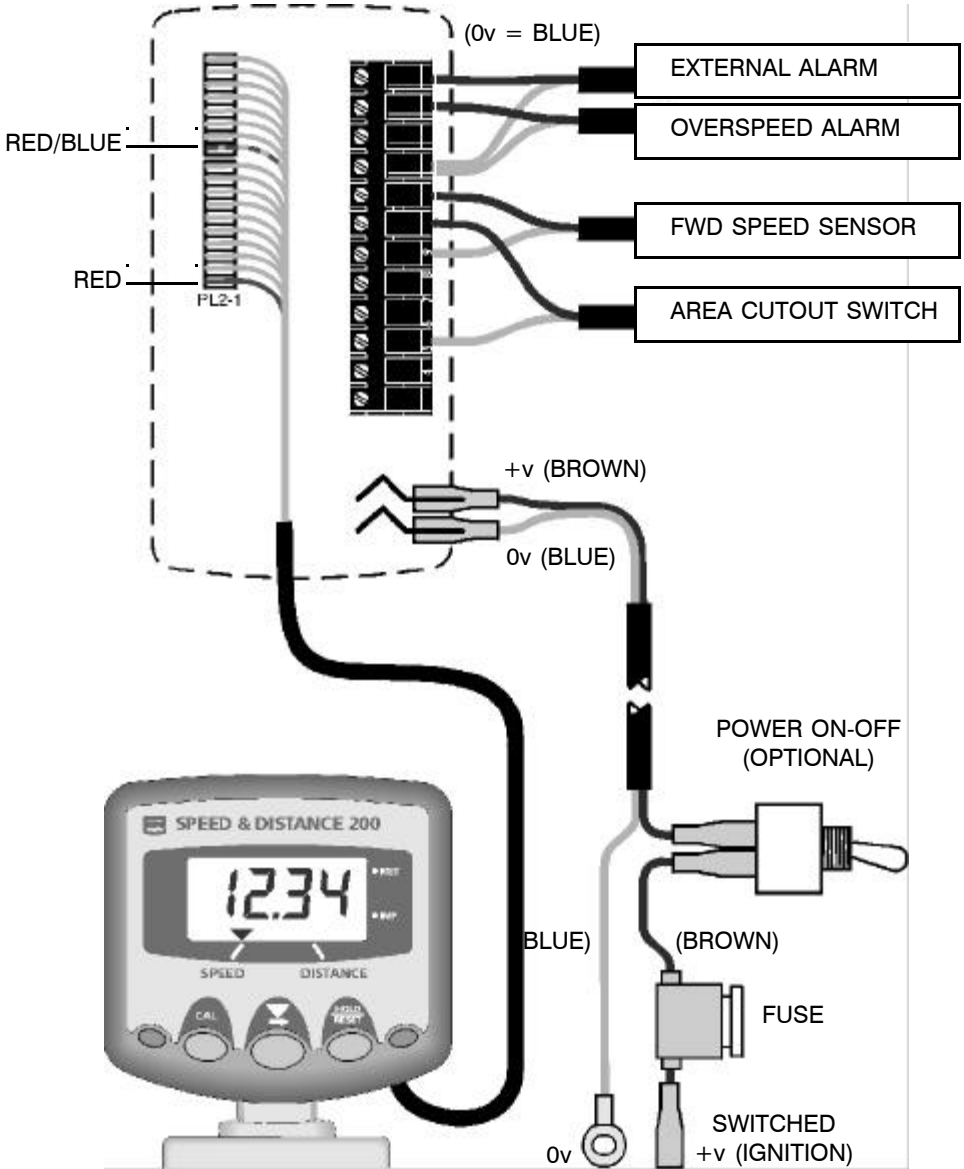
## 2 - Wiring

### SAM 200 (Replaces Jubilee 2)



# 2 - Wiring

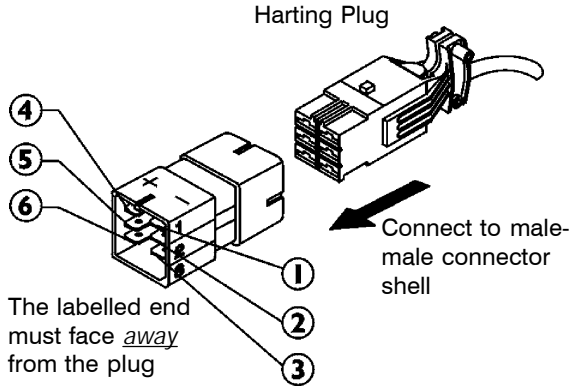
## Speed-distance 200 Meter



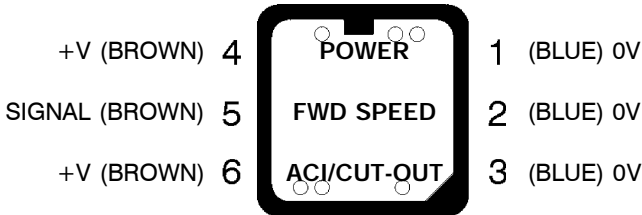
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# 2 - Wiring

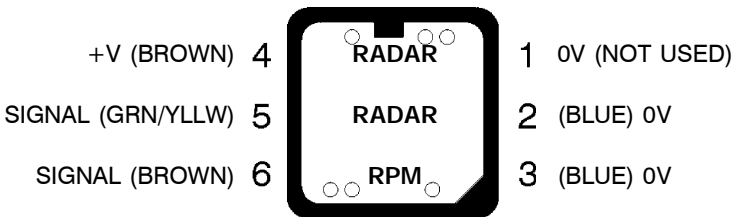
## TRACTOMETER



## GREY HARTING CONNECTOR



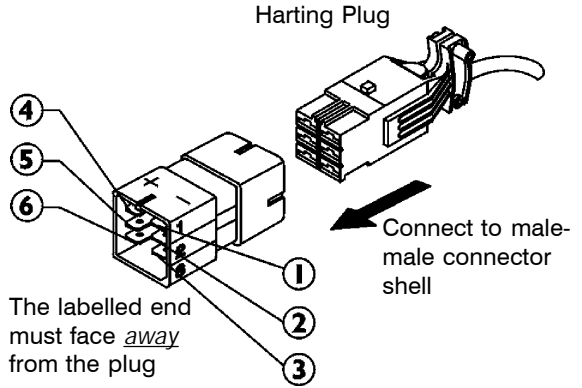
## BLUE HARTING CONNECTOR



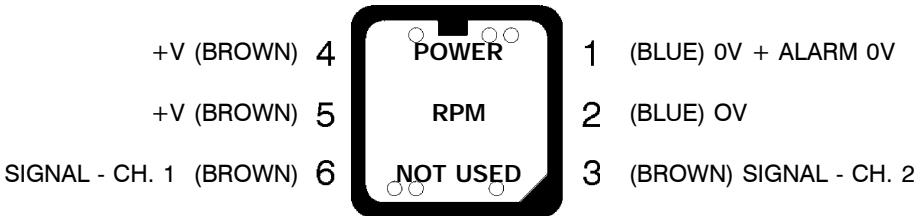
Fitting instructions:

- Power supply:** 12V - refer to page 21; 24V - refer to the installation leaflet supplied in kit ref: K/INST/24V
- Speed Sensor:** Refer to pages 24 - 33
- RPM Sensors:** Refer to pages 24 - 33
- Radar Sensor:** Refer to pages 34 - 35
- Cut-out:** Refer to pages 36 - 46
- ACI:** Refer to the installation leaflet supplied in the kit.

### DIGITAL TACHOMETER



### GREY HARTING CONNECTOR

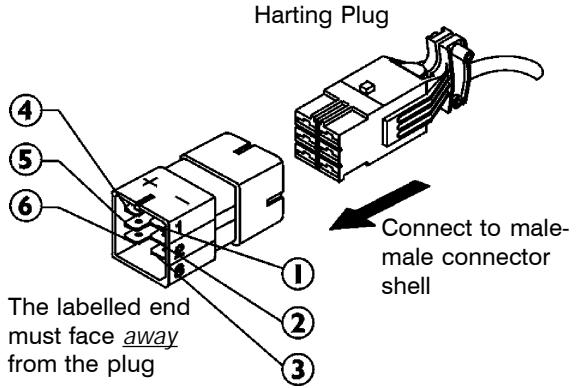


### Fitting instructions:

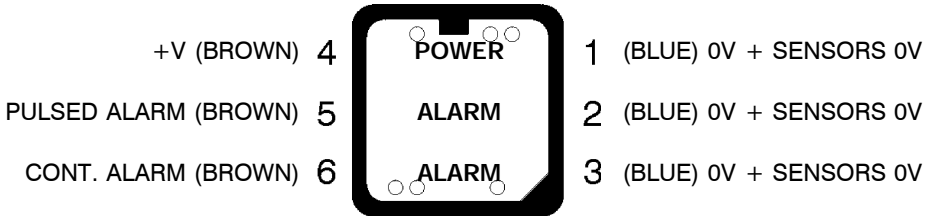
- Power supply:** 12V - refer to page 21; 24V - refer to the installation leaflet supplied in kit ref: K/INST/24V
- RPM Sensor:** Refer to pages 24 - 33
- External Alarm:** Refer to page 47.

# 2 - Wiring

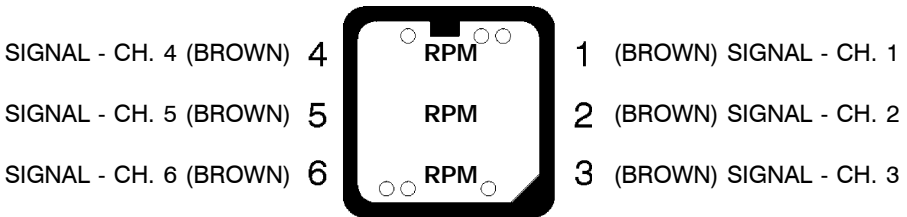
## 6-CHANNEL SHAFT SPEED MONITOR



### GREY HARTING CONNECTOR



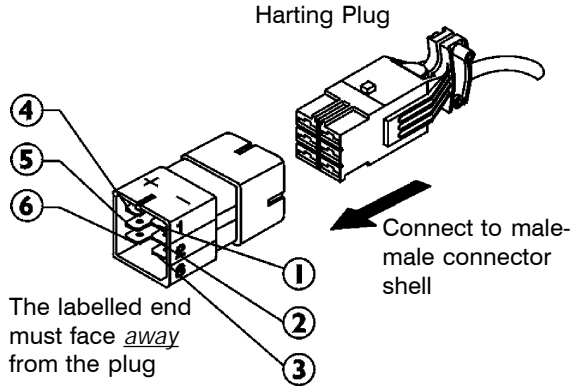
### BLUE HARTING CONNECTOR



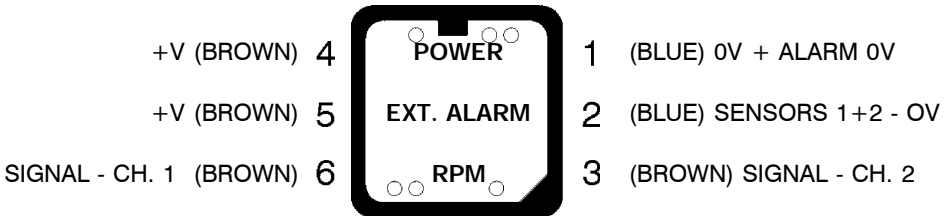
#### Fitting instructions:

- Power supply:** 12V - refer to page 21; 24V - refer to the installation leaflet supplied in kit ref: K/INST/24V
- RPM Sensors:** Refer to pages 24 - 33
- External Alarm:** Refer to page 47.

### 2-CHANNEL SHAFT SPEED MONITOR



### GREY HARTING CONNECTOR

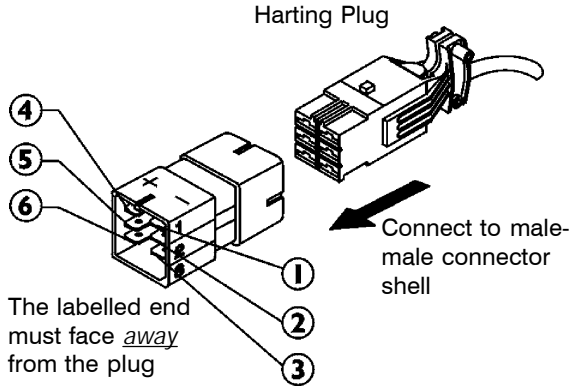


### Fitting instructions:

- Power supply:** 12V - refer to page 21; 24V - refer to the installation leaflet supplied in kit ref: K/INST/24V
- RPM Sensors:** Refer to pages 24 - 33
- External Alarm:** Refer to page 47.

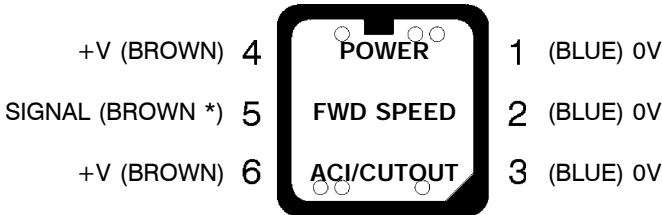
# 2 - Wiring

## SPRAYMETER 2

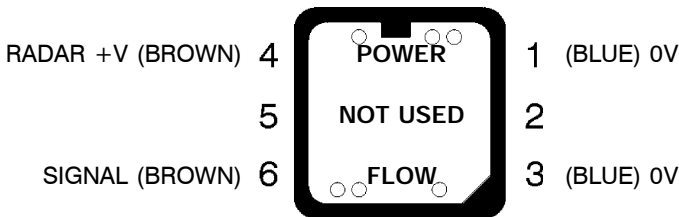


### GREY HARTING CONNECTOR

\*Green/Yellow for RADAR SIGNAL



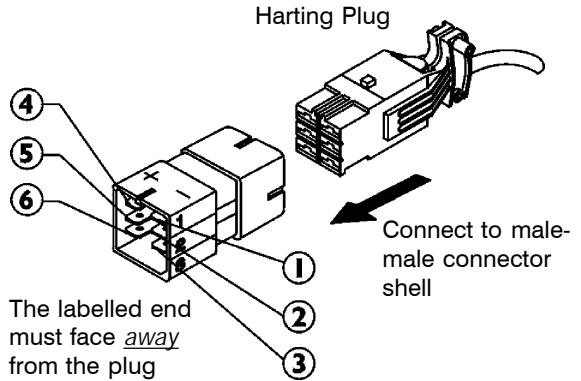
### BLUE HARTING CONNECTOR



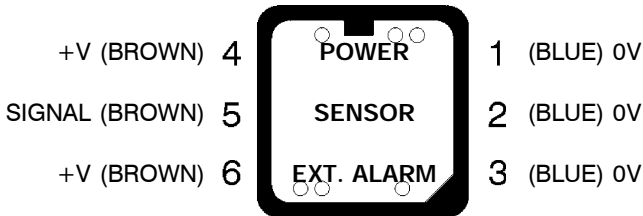
### Fitting instructions:

- Power supply:** 12V - refer to page 21; 24V - refer to the installation leaflet supplied in kit ref: K/INST/24V
- Flow Sensor:** Refer to the installation leaflet supplied in the kit.
- Speed Sensor:** Refer to pages 24 - 33
- Radar Sensor:** Refer to pages 34 - 35
- Cut-out:** Refer to pages 36 - 46
- ACI:** Refer to the installation leaflet supplied in the kit.

### "SILACOUNT" BALE WRAP MONITOR



### GREY HARTING CONNECTOR



#### Fitting instructions:

- Power supply:** 12V - refer to page 21; 24V - refer to the installation leaflet supplied in kit ref: K/INST/24V
- Sensor:** Refer to the installation leaflet supplied in the kit.  
Kit Ref: BW/SNR/KIT/001
- External Alarm:** Refer to page 47.

## 2 - Wiring

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### 2.1 Junction Box - ("Wizard" Instruments Only)

A standard junction box or "Terminator" as it is also known, provides for connecting the 18-core head unit cable, all sensors and the power supply.



*The Terminator is not sealed. It must be located where it will be protected from EXCESSIVE MOISTURE AND DIRT*

1. The Base Moulding can be mounted using the screws provided, or can be left in-line with the cables.
2. Connect the head unit lead onto the PCB header PL2.

*NOTE: The red wire on the 10-way plug goes to pin 1 on the PCB connector.*

*The blue/red wire on the 8-way plug goes to pin 11 on the PCB connector (fig. 2).*

3. Locate the cable grommet onto the moulding, and cable-tie the head unit lead onto the moulded cable saddle to provide strain relief (fig. 2).
4. If your instrument works with an ICP200 In-Cab Printer, then connect the printer lead to the PCB header PL1. Similarly cable-tie this lead to provide strain relief.

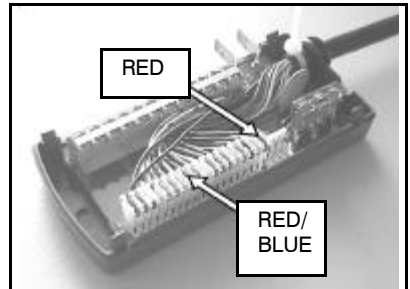


Fig. 2

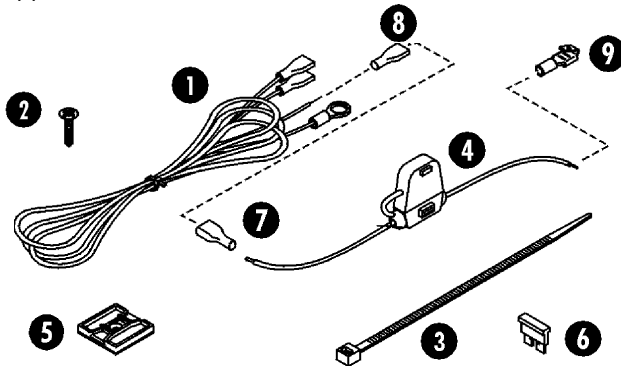
5. Stick the label onto the lid of the junction box.
6. Connect the sensors. The wiring connections are printed on the label supplied with the Terminator.

*NOTE: No means of strain relief is provided for the sensor cables. It is recommended that you cable-tie them securely in a suitable manner to prevent strain on the screw terminal connections.*

### 2.2 Power Supply - 12v Negative Earth Vehicles

#### Kit Ref: K/INSTRUMENT

Work measurement instruments are normally supplied with this kit for 12v operation.



The instrument normally operates from a 12V DC supply,

The junction box is fitted with a 3A fuse, varistors for protection from voltage transients and a power-on LED.

**The fuse in the junction box will only protect the junction box circuitry and the head unit. It will NOT protect the power supply cable.**



Key	Part	Qty
1.	Power Lead	1
2.	S.T. Screw	2
3.	Cable Tie	50
4.	Fuse Holder	1
5.	Cable Tie Base	6
6.	Fuse - 5A	2
7.	1/4" Crimp - female	2
8.	1/4" Crimp - male	1
9.*	1/4" Crimp - piggyback	1

\*May be part of cable assembly

## 2 - Wiring

---

The standard power supply lead is a 2-core lead with two 1/4" female terminals at one end, and a ring terminal and piggyback connector at the other end

1. Connect the blue 0V and brown +V wires onto the spade connectors of the junction box ("Wizard" instruments), or to terminals 1 and 4 of the grey "Harting" connector (UDM instruments).

*NOTE: Do not connect the power supply to any of the screw terminals on the PCB.*

2. Route the power lead back to a switched, fused point, e.g. from the back of the ignition switch or from the fuse box.
3. Connect the in-line fuse to the brown wire of the power supply lead using the male and female crimp provided.
4. Connect the 0V ring terminal to the bodywork/chassis. Ensure connection onto bare metal and that the connection point gives a good grounding path to the battery.
5. Fit the piggyback crimp connector to the other end of the fuse, and connect to the supply point.

*NOTE: The head unit does not have an integral On-Off switch, and is normally powered on via the ignition circuit. However, a toggle switch (Part No: S/AC/199-2-134 :- not supplied) can be wired in-line with the +v supply.*

*If required, panel-mount the toggle switch at a suitable point (1/2" dia drill required) and connect into the +V (brown) wire of the supply lead. If required, use a suitable length of the same gauge wire.*

### 2.3 Power Supply - 24v Negative Earth Vehicles

The "Wizard" instrument and "UDM-J" instruments will operate satisfactorily over the voltage range 10 - 30V DC.



A 24V to 12V converter *is* required for the older "UDM" instruments.

Order Kit Ref: K/INST/24V. Instructions are included.

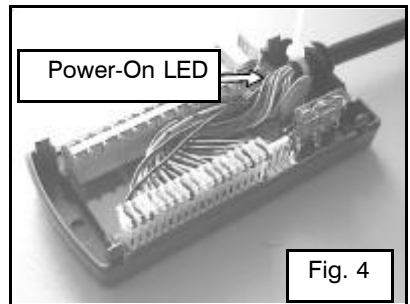
#### 2.3.1 Reverse Polarity and Power LED ("Wizard" Instruments only)

If you inadvertently have the power supply connections reversed, nothing will work. The head unit has reverse polarity protection and will not be damaged.

The LED on the Terminator PCB (fig. 4) will not light if the 0V and +V connections are reversed.

If the instrument does not power up when you switch the ignition on, then:

- (a) check you have connected to a suitable point on the vehicle electrical system as described above.
  - (b) If (a) is OK but the LED is not lit, check the polarity is correct.
  - (c) If the LED is lit but the head unit does not come on, check that the 18-way connector is properly connected.
6. Once all is OK, clip the lid on the Terminator. To remove the lid, squeeze the sides of the base inward to release the clips.



# 3 - Speed Sensor

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Your work measurement instrument is supplied with one of 7 different kits available for speed sensing e.g. for ground speed, shaft speed, fan RPM etc and wheel slip.

All the kits include at least one magnetic sensor, and depending on the application, are designed for sensing the following rotating components,

- K/WL/SNR** - Wheel
- K/PROP/SHAFT** - Propellor shaft
- K/PTO/SNR** - PTO output
- K/SSM/SNR** - Shaft end
- K/ALT/SPEED/INT** - Engine Alternator

The kit K/ATV/SNR/KIT is a combined Speed Sensor /Head Unit mounting kit for an ATV.

A True Ground Speed Sensor (TGSS) Radar Sensor kit is also available. In conjunction with a standard speed sensor mounted on a driven axle, wheel slip can be measured with the Tractometer.

## 3.1 Wheel Sensor Kit

**Kit Ref: K/WL/SNR**

The sensor is mounted off the axle, and is triggered by the magnets mounted EQUI-SPACED on the wheel hub, passing the end of the sensor (fig. 5).

Preferably, it should be mounted on a non-driven axle to avoid measurement error due to wheel slip.

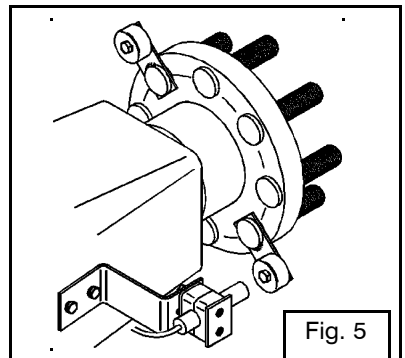


Fig. 5

### 3.1.1 Number of magnets

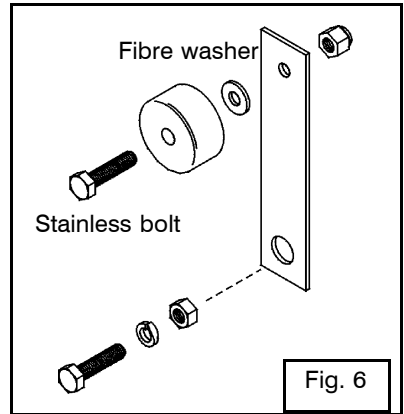
The number of magnets fitted is important. To measure the speed reliably, the instrument must receive not less than 1 pulse per second from the sensor.

As a rule of thumb, if the wheel is less than 1 metre diameter then 2 magnets are sufficient. For wheels over 2 metres in diameter, use 4 magnets.

The standard wheel kit includes 2 magnets.

For each additional magnet and magnet carrier assembly, order kit ref: K/WL/MGNT/COM (fig.6).

However many magnets are use, they must be equally spaced around the hub.

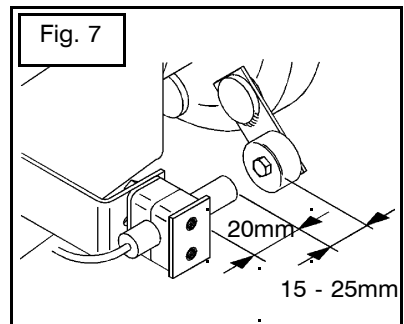


### 3.1.2 Mounting the Wheel Sensor

The most important requirements on installation are,

- (i) the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting clamp and from surrounding metalwork.
- (ii) the magnets should pass within 25mm (1") of the end of the sensor.

Cut and bend the Clamp Support Bracket and Magnet Mounting Brackets as required, to conform to (i) and (ii) above (fig.7).



**NOTE:** The sensor will be better protected if mounted behind the axle (or kingpin assembly on a steered axle).

## 3 - Speed Sensor

The wheel magnets may be bolted directly to the wheel if preferred. Alternatively, it is often convenient to attach the magnet mounting brackets directly behind the wheel stud flange. **Stitch-weld** for security (fig. 8).

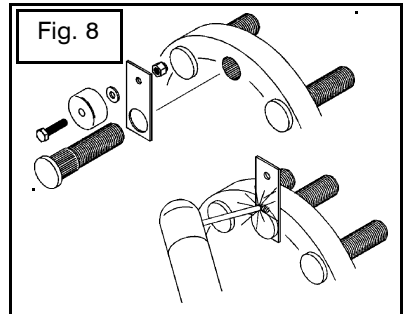


Each wheel magnet must be attached to the bracket using the **STAINLESS BOLT** with the **FIBRE WASHER** between the magnet and bracket (fig. 6).

Use the cable ties supplied to attach the sensor cable securely to the axle and back to the junction box. Follow existing wiring where possible to protect the cable from possible damage.



Ensure that steering or pivoting components will not pinch or stretch the cable.

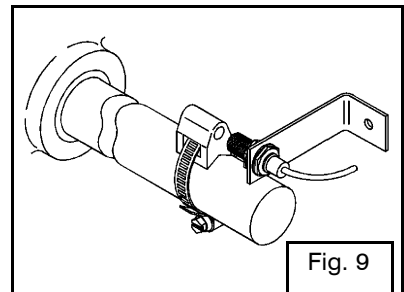


### 3.2 Prop Shaft Kit

Kit Ref: K/PROP/SHAFT

On some vehicles it is more practical to use a speed sensor on a transmission drive shaft (fig. 9).

The rotation of the drive shaft must be proportional to the ground speed i.e. where there is no **variable** ratio gearing between the drive shaft and the wheel.



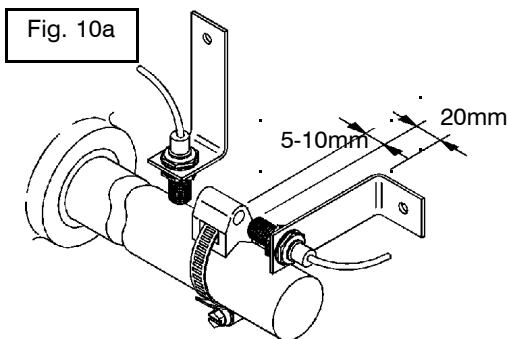
#### 3.2.1 Mounting the Prop Shaft Sensor

The most important requirements on installation are,

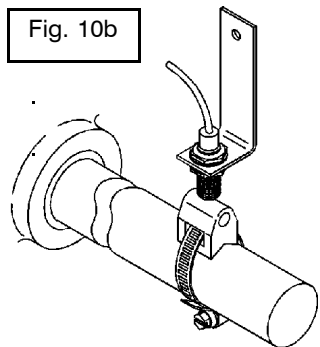
## 3 - Speed Sensor

- (i) the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting bracket and clear from surrounding metalwork (fig. 10a).
- (ii) the END FACE of the magnet carrier should pass within 5 - 10mm (1/4" - 3/8") of the end of the sensor (fig. 10a).

**NOTE:** *The magnet must not be positioned as shown in figure 10b. This may result in unreliable operation*



Correct orientation



Incorrect orientation

Cut and bend the sensor mounting bracket as required.

If the propeller shaft is enclosed by a guard plate (e.g. the front axle propeller shaft on some 4WD tractors), then you can often mount the sensor body by drilling a 12mm (1/2") hole through the side of the guard.

Use the cable ties supplied to attach the sensor cable securely to the axle and back to the junction box. Follow existing wiring where possible to protect the cable from possible damage.

# 3 - Speed Sensor

## 3.3 PTO Shaft Sensor Kit

Ref: K/PTO/SNR

The sensor is mounted off to one side of the PTO shaft. A magnet carrier with a single magnet, is fitted over the PTO shaft and held in place with a grub screw.

### 3.3.1 Mounting the PTO Shaft Sensor

A universal mounting bracket is provided which may be cut and bent as required to give the correct magnet/sensor relationship (fig. 11).

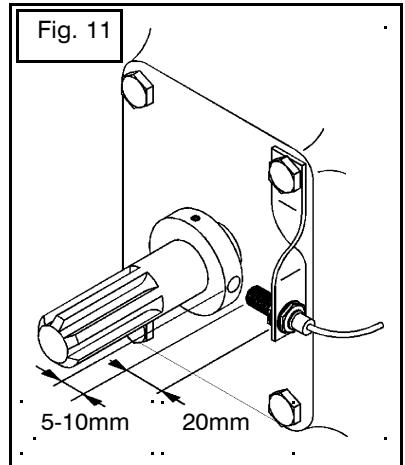


**However the sensor is to be mounted, the existing PTO guard must be retained.**

The most important requirements on installation are,

- (i) the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting bracket and clear from surrounding metalwork (fig. 11).
- (ii) the magnet embedded in the circular magnet carrier should pass within 5 - 10mm (1/4" - 3/8") of the end of the sensor (fig. 11).

Use the cable ties supplied to attach the sensor cable securely to the bracket and back to the junction box. Follow existing wiring where possible to protect the cable from possible damage.

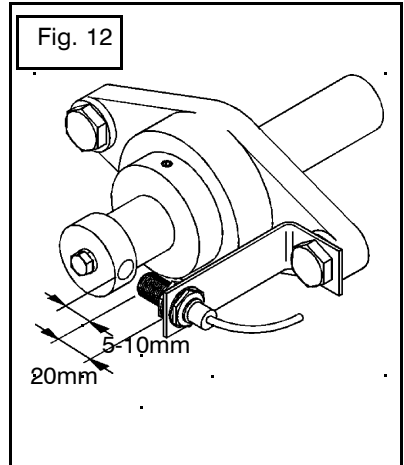


### 3.4 Shaft - End-Mounting Kit

Kit Ref: K/SSM/SNR

This kit enables a speed sensor to be mounted on the end of a shaft for example, measuring a fan speed.

A universal mounting bracket is provided which may be cut and bent as required to give the correct magnet/sensor relationship (fig. 12).



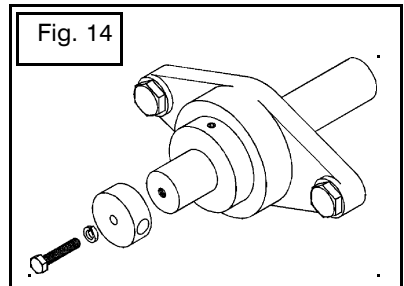
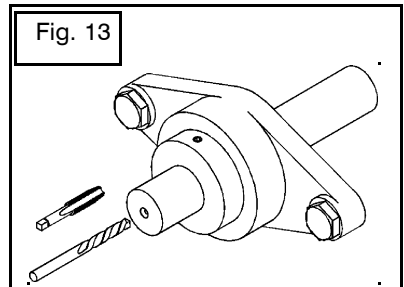
#### 3.4.1 Mounting the Shaft Speed Sensor

The most important requirements on installation are,

- (i) the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting bracket and clear from surrounding metalwork (fig. 12).
- (ii) the magnet embedded in the circular magnet carrier should pass within 5 - 10mm (1/4" - 3/8") of the end of the sensor (fig. 12).

Drill and tap the end of the shaft to attach the magnet carrier (figs 14, 15). An M6 Tap is provided in the kit.

Use the cable ties supplied to attach the sensor cable securely to the bracket and back to the junction box. Follow existing wiring where possible to protect the cable from possible damage.



# 3 - Speed Sensor

## 3.5 Alternator Speed Sensor Kit

Kit Ref: K/ALT/SPEED/INT

This is required for sensing Engine RPM.

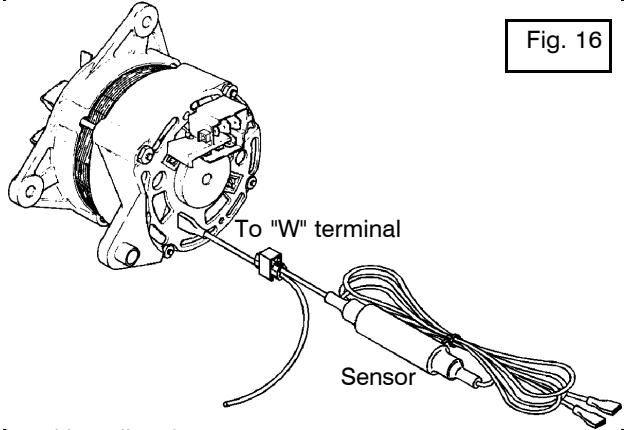


Fig. 16

Connect the yellow wire either directly to the "W" terminal on the alternator, or connect into the wire coming from the "W" terminal, using the "Snaplok" connector supplied in the kit (fig. 17).

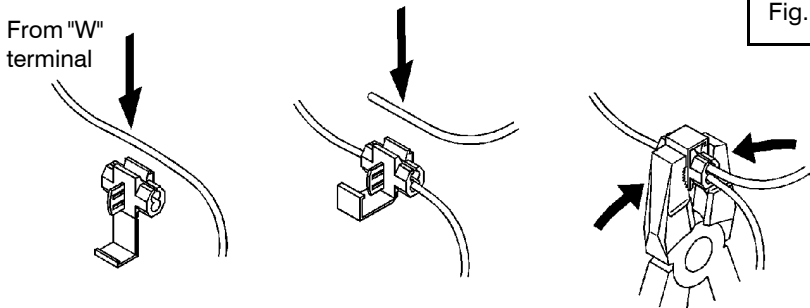


Fig. 17

If you are unsure which is the "W" connection, then consult the machine maintenance manual.

### 3.6 ATV Mounting Kit

Kit Ref: ATV/SNR/KIT

This kit includes a mounting plate to fit the head unit onto the handlebars of a Honda ATV (fig. 18).

It has a magnetic sensor with two types of magnet and magnet mountings:

- (i) wheel mounted magnets for Honda and other ATV's with **enclosed** drive shafts.
- (ii) "saddle-mounted" magnet carriers (as supplied with kit ref: K/PROP/SHAFT) for Yamaha and other ATV's with **exposed** drive shafts.



Fig. 18 - Handlebar Mounting

#### 3.6.1 Head Unit Mounting

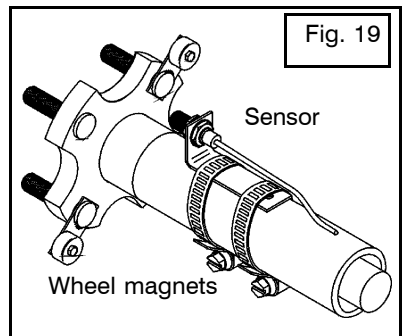
Refer to section 1.2

#### 3.6.2 Mounting Speed Sensor on ATV's with Enclosed Drive Shafts

##### *Fitting the magnets*

Use the blue wheel magnets and brackets (fig. 19).

1. Slacken, but do not remove, two alternate wheel nuts on the left-hand wheel. Using a piece of wood to protect the nuts and studs, knock the two wheels studs out of the hub.
2. Attach the magnet mounting brackets directly behind the wheel stud flange.



# 3 - Speed Sensor

- Adjust the fixing angle of each bracket to be the same, to ensure the magnets are equi-spaced around the hub. Stitch-weld for security.



Each wheel magnet must be attached to the bracket using the **STAINLESS BOLT** with the **FIBRE WASHER** between the magnet and bracket (fig. 20).

## Mounting the Sensor

The most important requirements on installation are,

- the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting bracket and clear from surrounding metalwork (fig. 19).
  - the magnets should pass within 25mm (1") of the end of the sensor (fig. 19).
- Cut and bend the Sensor Mounting Bracket as required, to conform to (i) and (ii) above (fig.19).
  - Attach the bracket to the axle tube using the two hose clips.

*NOTE: The sensor will be better protected if mounted above the axle.*

- Use the cable ties supplied to attach the sensor cable securely to the axle and back to the junction box. Follow existing wiring where possible to protect the cable from possible damage.



Ensure that steering or pivoting components will not pinch or stretch the cable.

- Re-tighten the wheel nuts to the appropriate torque.

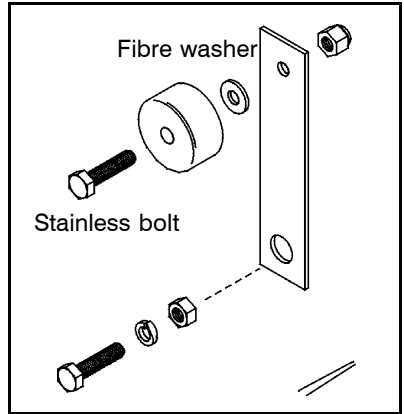


Fig. 20 - Magnet Mounting

## 3 - Speed Sensor

### 3.6.3 Mounting Speed Sensor on ATV's with Exposed Drive Shafts

On Yamaha and other machines with exposed drive shafts, use the two "saddle-mounted" magnet carriers.

1. Clamp the magnet carriers onto the driveshaft with the hose clip as shown (fig. 21). The magnets must be directly opposed to each other.

The most important requirements on installation are,

- (i) the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting bracket (fig.21).
  - (ii) the END FACES of the magnet carriers should pass within 5 - 10mm (1/4" - 3/8") of the end of the sensor (fig. 21).
2. Mount the sensor in the same bracket, which should be mounted off one of the differential housing bolts Cut and bend the Sensor Mounting Bracket as required, to conform to (i) and (ii) above.

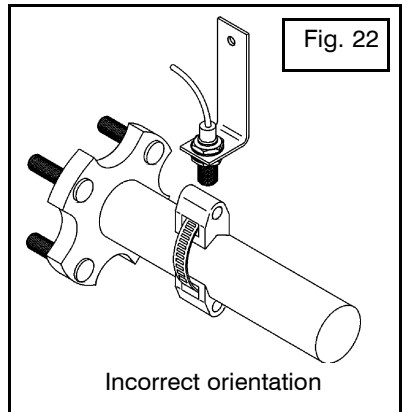
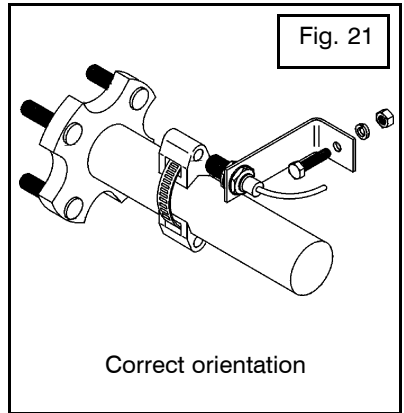
*NOTE: The magnet must not be positioned as shown in figure 22. This may result in unreliable operation*

*NOTE: The sensor will be better protected if mounted above the axle.*

3. Use the cable ties supplied to attach the sensor cable securely to the bracket and back to the junction box. Follow existing wiring where possible to protect the cable from possible damage.

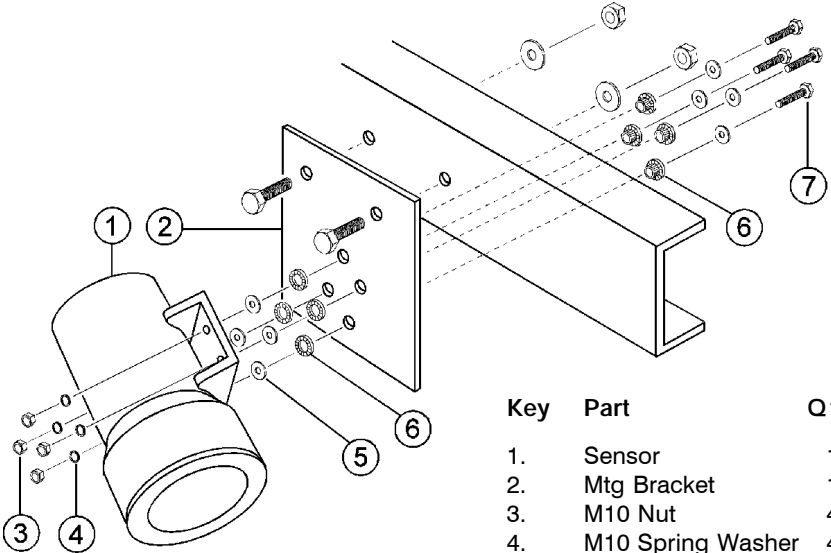


Ensure that steering or pivoting components will not pinch or stretch the cable.



# 3 - Speed Sensor

## 3.7 TGSS Radar Sensor



Key	Part	Qty
1.	Sensor	1
2.	Mtg Bracket	1
3.	M10 Nut	4
4.	M10 Spring Washer	4
5.	M10 Plain Washer	8
6.	AV Mount	4
7.	M10 x 50 Hex. Screw	4

### 3.7.1 Installation

The sensor works equally well mounted facing rearwards or forwards, however it will be afforded greater protection from damage if mounted rearwards.



**The mounting angle is critical to the accuracy of the instrument.**

1. Mount the sensor either directly onto the vehicle chassis or on its mounting bracket, at an angle of  $37^{\circ} \pm 2^{\circ}$  from the horizontal.

The correct mounting angle is automatically achieved by positioning two diagonally opposite holes on a vertical line (fig. 23). The mounting bracket will give this angle when mounted square to the vehicle.

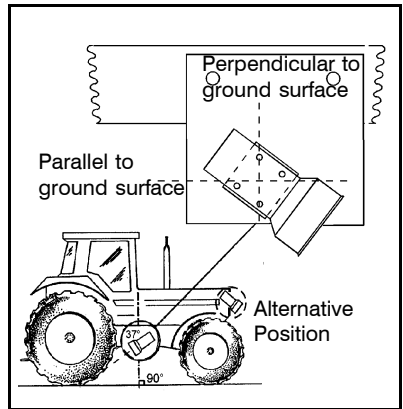


Fig. 23 - Mounting position

## 3 - Speed Sensor

Mount the sensor so that ideally, the sensor lens is between 60 and 90 cm above the ground, and near to the vehicles centre of gravity. This will minimise the effect of the vehicle rolling and pitching.

2. Fit the radar sensor to the bracket (or to the vehicle frame) using the anti-vibration mounts as shown in figure 24. Do not overtighten the nuts. Ensure that the anti-vibration (AV) mounts are not squeezed up to much as to be ineffective.

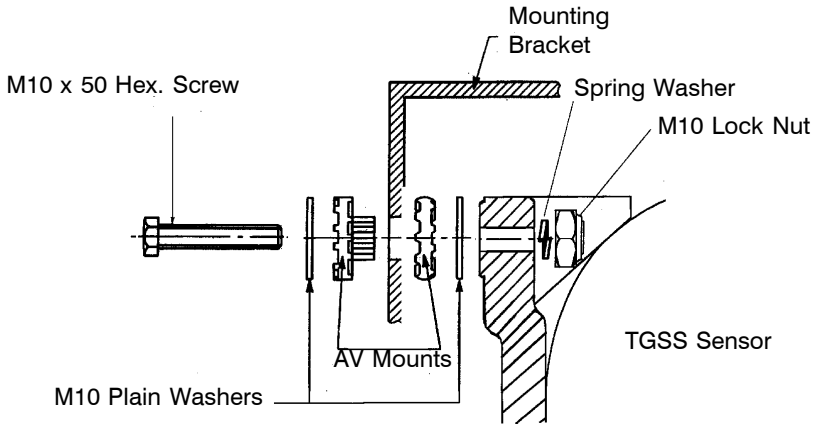


Fig. 24 - Anti-vibration mounting

### 3.7.2 Wiring Connections

Wire Colour	F unction
Brown	9 v to 16v Power
Blue	0v
Yellow/Green	S ignal

## 4 - Cut-out Switches

A wide variety of automatic cut-out switches are available to suit any requirement. In any application where an RDS instrument is measuring area, distance or time worked, a cut-out switch must be installed to interrupt recording when the implement is out of work.

**NOTE:** For all instruments, the switch contacts must close to interrupt recording.

All except the diode cut-out switches are compatible with all RDS instruments, Ford/New Holland electronic dashboard, MF Datatronic and most JCB Fastrac models.

### 4.1 Pull Switch

**Kit Ref:**  
**CUT/OUT/KIT/001**

This switch is used in a situation where the implement operating control mechanism moves as the implement is engaged or disengaged.

The pull switch is arranged such that the switch is pulled when the implement is out of work (fig. 25).

Maximum extension of the pull switch is approximately 50mm but greater movement can be accommodated by use of a length of chain to take up "dead movement".



**Be careful that the spring cannot be over-extended, or that the switch cannot be crushed when retracted.**

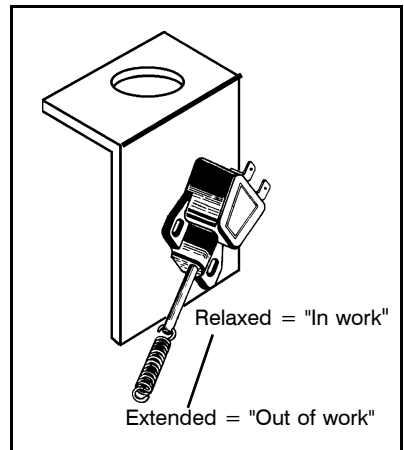


Fig. 25 - Pull Switch

## 4 - Cut-out Switches

### 4.2 Reversed Pull Switch

Kit Ref: CUT/OUT/KIT/007

This operates in reverse to Pull Switch ref: CUT/OUT/KIT/001, i.e. the switch is pulled when the implement is in work, and retracts when the implement is out of work (fig 26).

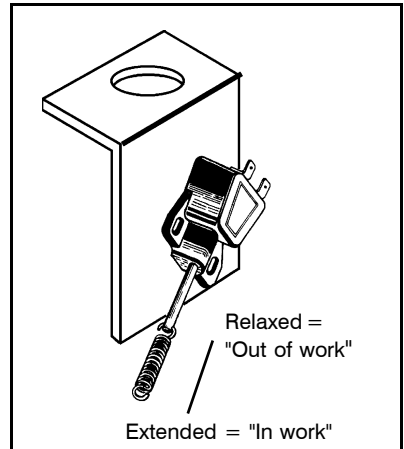


Fig. 26 - Reversed Pull Switch

### 4.3 Magnet and Reed Switch

Kit Ref: CUT/OUT/KIT/002

This switch is intended for use where the control lever operating the implement has a defined and consistent "out of work" position.

*NOTE: It cannot be used on self-centering spool valve levers.*

A 25mm diameter magnet is attached to the operating lever and the reed switch is located adjacent to the magnet when the lever is in the "out of work" position (fig. 27).

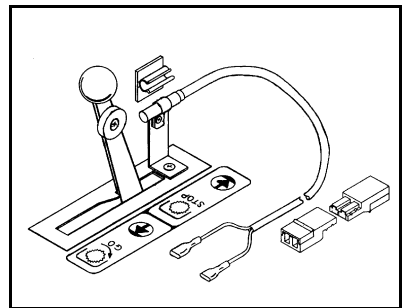


Fig. 27 - Magnet and Reed Switch

The switch will operate within 10 mm of, and in almost any alignment to, the magnet.

Use Kit Ref: CUT/OUT/KIT/009 (Shaft Sensor) if you require a more robust sensor.

## 4 - Cut-out Switches

### 4.4 Double-pole Toggle Switch

Kit Ref:  
CUT/OUT/KIT/003

This switch replaces the existing On-Off switch in a sprayer, or other electrically controlled implement switch boxes.

It can be used on a sprayer control box with individual switches and a wiring loom in the switchbox (not a printed circuit board).

*NOTE: This switch is not suitable for Allman, Evrard or Hardi switch boxes. For these applications use the Diode Switch (Kit Ref: CUT/OUT/KIT/014).*

1. Replace the existing on-off switch with the double-pole switch. The switch has a 12.5mm (1/2") diameter shank for panel mounting.
2. **Connect the existing wires to terminals 2 and 4.** With the switch in the up (OFF) position these contacts are open, thus breaking the circuit (fig. 28).
3. **Connect the cut-out lead to terminals 3 and 5.** With the switch in the up (OFF) position these contacts are closed, thus interrupting the instrument recording (fig. 28).

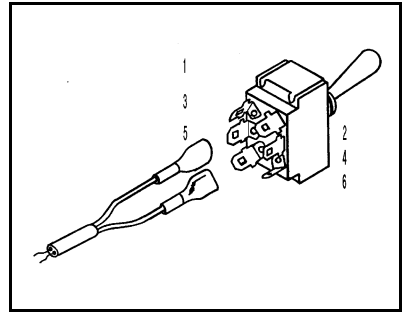


Fig. 28 - Double Pole Switch

## 4.5 Pneumatic switch

Kit Ref:  
CUT/OUT/KIT/004

This switch is intended for use with pneumatically controlled sprayers or other implements.

The pneumatic switch has both normally open (NO) and normally closed (NC) contacts and can therefore, be wired to override when the system is either pressurized or depressurized. The trip pressure is set at 2 bar (29 p.s.i). The maximum pressure is 10 bar (145 p.s.i.).

The switch body has an 1/8" BSP female port and the kit includes a tee piece for teeing into 4mm air-line tubing (fig. 29).

### 4.5.1 Fitting the Pneumatic switch

1. Remove the 4 screws and remove the labelled cover plate to reveal the microswitch. Remove the pin locating the microswitch and remove the microswitch.
2. Slacken the cable gland and feed the cable through. Connect the wires to terminals 1 and 3 for the cut-out to operate at high pressure, or to terminals 1 and 2 for the cut-out to operate at low pressure.
3. Replace the microswitch locating pin in the switch housing ensuring that the angled bar at the bottom of the housing is located.

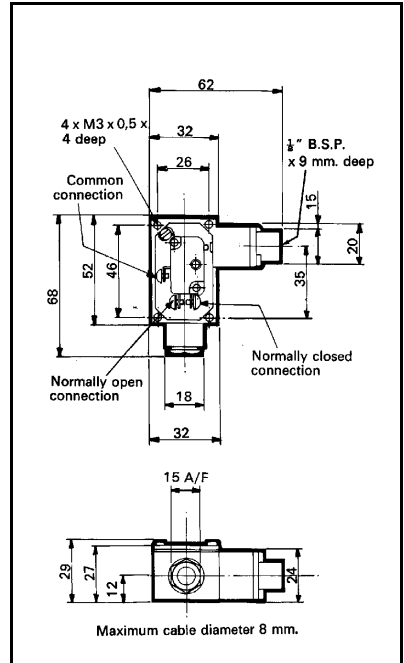


Fig. 29 - Pneumatic Switch

## 4 - Cut-out Switches

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4. Draw the cable back through the gland, ensuring the microswitch plunger is positioned directly under the pressure port, and the microswitch body is located on the pin on the angled bar.
5. Fit the cover plate (do not over-tighten the screws) and tighten the cable gland.
6. Connect into the pressure line.
7. Mount the switch using self-tapping screws into the four holes on the rear of the housing.

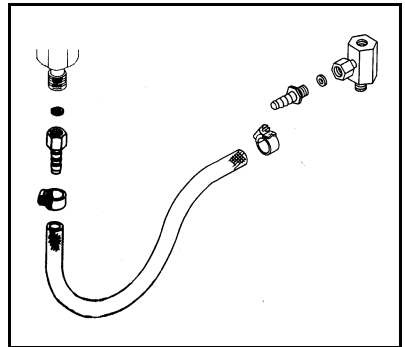
### 4.6 *Low-pressure Hydraulic \_\_\_\_\_ Switch*

**Kit Ref:**  
**CUT/OUT/KIT/005**

This switch is intended for use on sprayers to override the instrument when the sprayer is switched off, and the liquid pressure drops below 1 bar

The trip pressure is adjustable between 1 and 10 bar. The kit includes fittings to tee into the pressure gauge line (fig. 30).

1. Provided the pressure gauge goes to zero when the sprayer is switched off, fit the tee piece adaptor directly below the existing gauge coupling. The adaptor has a 1/4" BSP thread suitable for the majority of pressure gauges. Use fibre washers to seal the base of the connectors.
2. On some sprayers, the pressure gauge is tapped into the manifold. If the booms are switched off, the manifold does not lose pressure, and therefore the switch will not function.



*Fig. 30 - Hydraulic Switch*

## 4 - Cut-out Switches

In these cases you will have to tee the pressure switch into a boom section line.

3. Connect the short length of hose to the tee piece and secure with a hose clip.
4. Form the hose into the shape illustrated using the hose adaptor and hose clip.
5. Mount the pressure switch in a vertical position and secure to the sprayer framework.

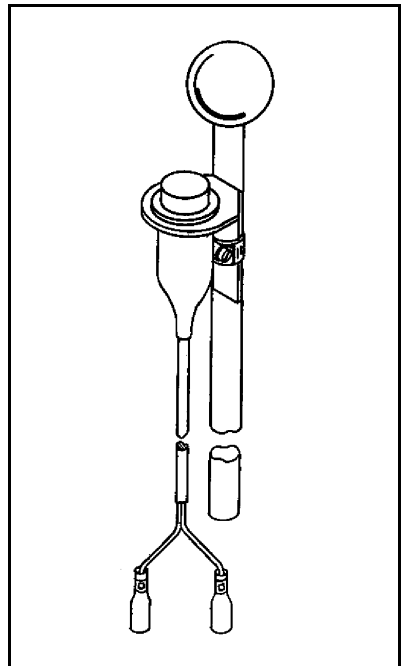
### 4.7 Manual Pushbutton Switch

**Kit Ref:**  
**CUT/OUT/KIT/006**

This switch is intended for use where it is not possible or not appropriate to install any of the automatic override switches.

It is a simple latching push button switch supplied with a bracket which can be installed on, or adjacent to the implement on-off control (fig. 31).

The operator must press the switch each time the implement is engaged and disengaged.



*Fig. 31 - Manual Switch*

## 4 - Cut-out Switches

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### 4.8 High-pressure Hydraulic Switch

**Kit Ref:**  
**CUT/OUT/KIT/008**

This switch has both normally open (NO) and normally closed (NC) contacts and can therefore, be wired to override when the system is either pressurized or de-pressurized.

The trip pressure is adjustable between 10 and 50 bar (145 - 725 p.s.i). The maximum pressure is 300 bar (4350 p.s.i.).



*Fig. 32 - Kit Contents*

#### 4.8.1 Pressure Adjustment

To adjust the trip pressure, remove the grub screw from the end of the switch body to access the adjusting screw at the bottom of the hole (fig. 33). Turn the adjusting screw clockwise to increase the trip pressure and vice versa.

Ensure that the high-pressure state is maintained throughout the cycle and does not just peak as the implement is engaged/disengaged.



*Fig. 33 - Pressure adjustment*

#### 4.8.2 Wiring Connection

If the switch is to override when pressurized, connect the cut-out cable to the **Black** and **Red** leads (NO).

If the switch is to override when de-pressurized, connect the cut-out cable to the **Black** and **Green** leads (NC).

### 4.9 Shaft Sensor Switch

**Kit Ref:**  
**CUT/OUT/KIT/009**

This is a more robust version of Kit Ref: CUT/OUT/KIT/002 (Magnet and Reed Switch). The sensor has a 12mm dia x 50mm long threaded plastic body.

It can be used on a 3-point linkage, or on linkage-mounted implements where there is a single, definite "out of work" position.

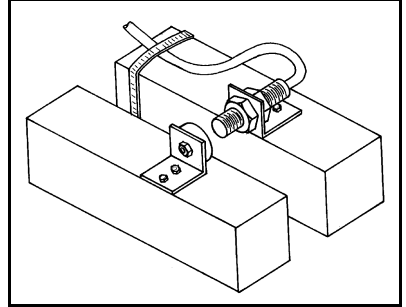


Fig. 34 - Shaft Sensor Switch

#### 4.9.1 Mounting the Sensor

The most important requirements on installation are,

- (i) the end of the sensor should protrude at least 20mm (3/4") from the end of the mounting bracket and clear from surrounding metalwork.
- (ii) the magnet should pass within 25mm (1") of the end of the sensor.

The general arrangement is typically as shown in figure 34. The sensor bracket can be modified as required to suit the installation, and to conform to requirements (i) and (ii) above.

The blue magnet must be attached to the bracket using the **STAINLESS BOLT** with the **FIBRE WASHER** between the magnet and bracket (fig. 35).

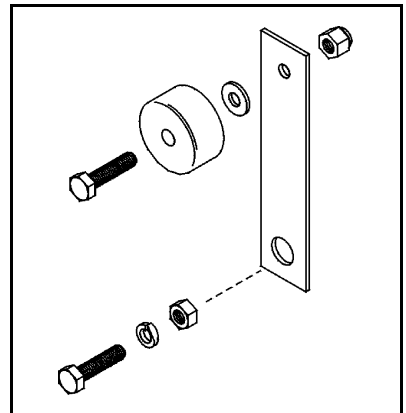


Fig. 35 - Magnet Mounting



# 4 - Cut-out Switches

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## 4.10 Finger Switch

Kit Ref:  
CUT/OUT/KIT/013

This environmentally sealed switch is intended for use on combine/forage harvester headers, fertiliser distributors, potato harvesters, three-point linkage mounted implements, and any application where a large physical movement of a mechanism can be used to deflect a 100mm long x 7mm dia. finger away from its rest position.

It has both normally open (NO) and normally closed (NC) contacts, and can therefore be wired to override when the switch is either deflected or at rest.

The finger can deflect in any direction. It also has a flexible base allowing significant deflection without damaging the switch.

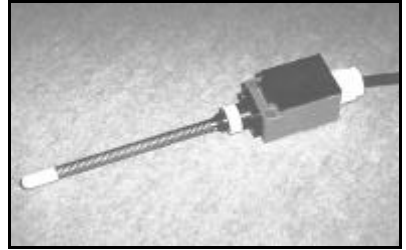


Fig. 36 - Finger Switch

### 4.10.1 Mounting on Harvesters

The header trunking should *deflect* the switch when it is lowered into the *working* position.

### 4.10.2 Mounting on Fertiliser Applicators

The slide which opens and closes the fertilizer orifice can be used to trip the switch. It may be necessary to fit a bolt to the slide in order to trip the finger.

### 4.10.3 Wiring Connections

Remove the front cover from the switch by prising it off with a screwdriver.

## 4 - Cut-out Switches

Four screw terminals are revealed (fig. 37).

Terminals 13 and 14 are normally open (NO) and terminals 21 and 22 are normally closed (NC).

As with all other switches, the instrument records when the switch is open and stops recording when the switch is closed. Therefore,

- (i) if the finger is at its *rest* position when the machine is in work, connect to terminals 13 and 14.
- (ii) If the finger is *deflected* when the machine is in work, connect to terminals 21 and 22.

Feed the override switch cable through the sealing nut, rubber gland and flat washer. Secure the wires under the appropriate terminals. Pull any excess cable back out of the body and tighten the cable gland to seal the cable entry.



Fig. 37 - Wiring terminals

### 4.11 Diode Switch

Kit Ref:  
CUT/OUT/KIT/014

This switch is intended as an alternative to the Double-Pole Toggle Switch (Kit Ref: CUT/OUT/KIT/003), which cannot be used in certain applications.

The diode switch however, can be used to override the RDS instrument being used with virtually *any* electrically controlled implement.

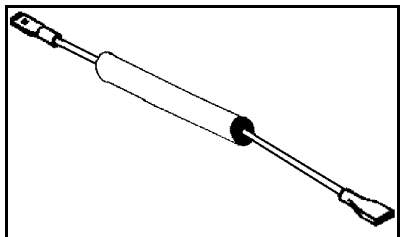


Fig. 38 - Diode Switch

## 4 - Cut-out Switches

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*NOTE 1: This switch is suitable for Allman, Evrard and Hardi sprayer switch boxes.*

*NOTE 2: The diode switch is not suitable for use with the Ford/New Holland electronic dashboard nor with the Massey Ferguson Datatronic.*

### 4.11.1 Wiring Connection

1. **Connect the Red wire** (cathode) of the diode onto the "ON" terminal of the existing On-Off switch (e.g. the main On-Off switch on a sprayer control box). Do not disconnect the existing wire to the switch.

Alternatively you can connect this wire onto any point which is at +V when the implement is in work, and at 0V when it is out of work (e.g. onto the "ON" terminal of any one of the boom section on-off switches on a sprayer control box)

Solder the wire on or use a "Snaplok" connector to connect into an existing wire.

2. **Connect the Black wire** (anode) of the diode to the "AREA CUTOOUT SW" terminal of the "Terminator" junction box, or in the case of a "UDM" instrument, connect the the AREA CUTOOUT + terminal on the appropriate Harting connector (the AREA CUTOOUT - terminal is not used).

*NOTE: If the instrument utilises an RDS "ACI Interface" then instead connect the black wire of the diode to the black wire of the ACI Interface lead.*

## 5 - Miscellaneous Fitments

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### *External Alarm*

An external alarm is an option on certain instruments.

Mount the alarm buzzer where it will stay dry. Fix the buzzer with 2 self-tapping screws.

**Do not over-tighten the screws.**



*Fig. 39 - External Alarm*

# Notes

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## *Document History*

- Issue 1: 10/3/01 Original Issue
- Issue 2: 30/5/01 p.10,11, 18 : Changes relating to "Terminator - Lite".
- Issue 3: 25/6/01 Added S-D200 Wiring diagram
- Issue 4: 17/7/01 Amended pages 21,22,23 ref. power supply.
- Issue 4b:29/8/01 Amended cross references on pages 14 - 19
- Issue 4c 9/1/02 Addendum 1.