



# PLANTER MONITOR

## User Guide



This user guide is applicable to the following Planter Monitor models:

PM8 PM8+2 PM14 PM22 PM26

# Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>2</b>
<b>2</b>	<b>FEATURES OF THE ELECTROLEE PLANTER MONITOR.....</b>	<b>3</b>
<b>3</b>	<b>SENSOR FEATURES .....</b>	<b>3</b>
<b>4</b>	<b>THE FRONT PANEL.....</b>	<b>4</b>
4.1	CHANNEL ACTIVITY INDICATOR LIGHTS (GREEN).....	4
4.2	CHANNEL ALARM IDENTIFICATION LIGHT (RED) .....	4
4.3	SEEDFLOW ALARM INDICATOR LIGHT (RED) .....	4
4.4	POWER ON BUTTON .....	4
4.5	POWER OFF BUTTON .....	5
4.6	ALARM ACKNOWLEDGE BUTTON.....	5
<b>5</b>	<b>INSTALLATION .....</b>	<b>5</b>
5.1	MOUNTING OF THE PLANTER MONITOR .....	5
5.2	INSTALLATION OF HIGH-RATE SEED FLOW SENSORS (D18 PRO).....	7
5.2.1	<i>Precision type seed tubes</i> .....	7
5.2.2	<i>Standard seed tubes</i> .....	8
5.3	INSTALLATION: MAGNETIC AXLE ROTATION SENSOR (MGS 07) .....	9
5.4	INSTALLATION: GRANULAR FERTILISER SENSOR (D93B PRO) .....	10
5.5	INSTALLATION: GENERAL PLANTER WIRING DIAGRAM .....	12
<b>6</b>	<b>MAINTENANCE .....</b>	<b>13</b>
6.1	MAINTENANCE OF THE SENSORS.....	13
6.2	MAINTENANCE OF ELECTRIC CONNECTIONS.....	13
6.3	MAINTENANCE OF CONTROL BUTTONS.....	13
6.4	MAINTENANCE IN GENERAL .....	13
<b>7</b>	<b>IMPLEMENTING THE PLANTER MONITOR .....</b>	<b>14</b>
<b>8</b>	<b>TROUBLESHOOTING.....</b>	<b>14</b>
<b>9</b>	<b>SPECIFICATIONS .....</b>	<b>15</b>
	<b>WARRANTY .....</b>	<b>16</b>
	<b>LIABILITY .....</b>	<b>16</b>

The optional Digital unit is not discussed in this manual. It is an extension of the planter monitor giving those important figures for planting correctly and with precision. It is used for calculating seed population and area planted. It is of great value to the user wanting to monitor seed population accurately.



# 1 Introduction

Thank you for purchasing an Electrolee Planter Monitor. Use the Electrolee Planter Monitor to keep an eye on your planting process. Various events can be monitored with a variety of sensors. It can for example be connected to seed sensors to register seed flow. Magnetic axle rotation sensors, granular fertilizer sensors as well as liquid fertilizer sensors are also available. Different types of sensors can be used in one system. One channel is needed for each item that is to be monitored.

If there is no activity at one or more of the channels for two seconds the alarm sounds. With the push of a button, a bright LED light indicates at which channel the problem lies. With the help of this system, the whole planting process can be viewed at once. Losses as a result of rows missed, can virtually be eliminated.

Models range from a 4-channel monitor to a 22-channel monitor. In most cases, channels can be allocated at will. Where the Digital Unit is used, the channel with the highest number must be connected to an axle rotation sensor. This channel and sensor are dedicated to distance measurement which is part of the area calculation function. This highest numbered channel is internally connected to the Digital Unit.

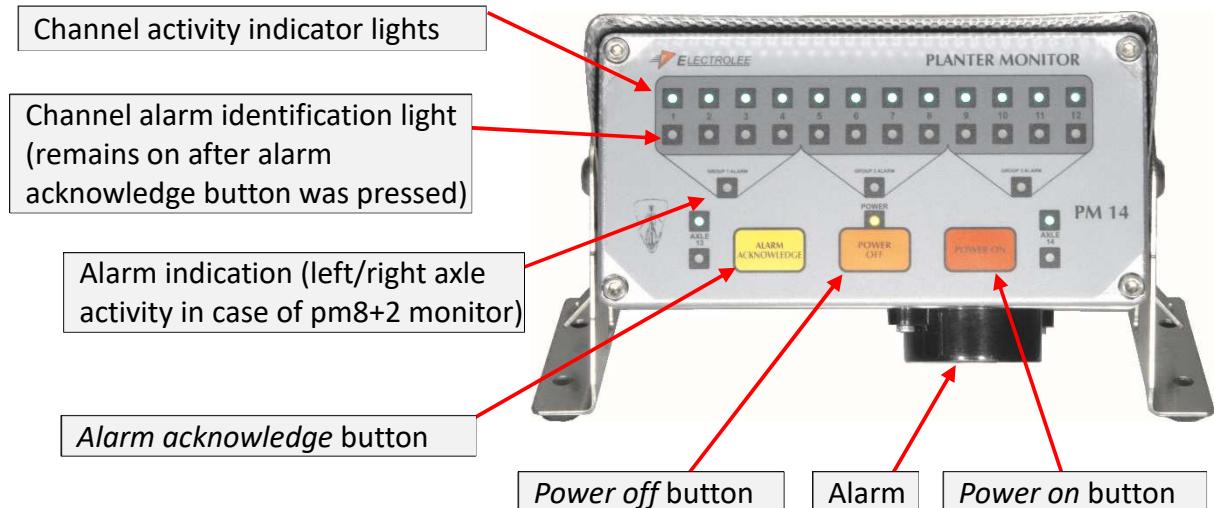
## 2 Features of the Electrolee Planter Monitor

- It is tough, economical and durable.
- User friendly and simple to use.
- Automatically senses which sensors are plugged in at the instant the system is switched on. Only those channels will be active.
- Sensors are uniquely small in size. This makes them easy to fit and can be installed in small places. Being small also makes them less vulnerable to damage.
- The monitor can be used to monitor seed flow, granular fertilizer flow, liquid fertilizer flow, as well as axle rotation.
- Should an over-current situation occur, an electronic self-resetting fuse protects the system. There is no need to replace any fuses.
- The high quality LED lamps never blow and thus never need replacement.
- The monitor is lightweight and easy to mount. It is also easy to dismount or move to another tractor.
- The system is rain resistant, although it should not be left exposed to rain for extended periods of time.
- It is dust resistant.
- The adjustable feet make it easy to adjust the unit for an optimal viewing angle. When planting at night, the monitor angle can be adjusted slightly so that the lights do not interfere with the driver's sight.
- The unit connects to the tractor's 12 Volt power outlet, or directly to the 12Volt battery. It is protected against reversed battery polarity.
- Three years warranty on all electronics. (Excluding wiring and electrical connectors.)
- Spares, advice and services are available locally from Electrolee.

## 3 Sensor Features

- The D18 sensors are of the high-rate type.
- The seed sensors and fertilizer sensors use infrared light. Infrared light is more efficient in dusty conditions than visible light.
- The lenses, which are exposed to dust and wear, are manufactured from polycarbonate plastic. (Polycarbonate is one of the toughest and most durable plastics available.)
- The sensors can be mounted on the seed tubes of a variety of planters. The sensors are very versatile due to their small size.
- Sensor power plugs are watertight.

## 4 The Front Panel



### 4.1 Channel activity indicator lights (green)

When a sensor causes a pulse due to a disturbance eg. a seed kernel falling passed it, the event is relayed to the indicator light related to that channel. Should the seed flow stop as a result of either a blockage or simply no seed flow, the light will also stop flashing. (After two seconds, the alarm will sound.)

### 4.2 Channel alarm identification light (red)

As soon as the alarm sounds, the *Alarm Acknowledge* button can be pressed to identify the channel causing the alarm. The alarm will change to an intermittent mode, and the appropriate channel alarm identification light will remain lit until the alarm condition is resolved. Should continuity to the sensor(s) be broken while the channel is active, this indicator light will illuminate immediately and cause an alarm. This effect can be seen easily when the main signal cable is unplugged while the system is still on.

### 4.3 Seedflow alarm indicator light (red)

This indicating light will flash while the alarm is sounding. (In the case of the PM8+2 model there is an exception: The axle rotation indicating light is in this position.)

### 4.4 Power on button

Switches on the power to the planter monitor. When this button is pressed, all sensors that are plugged in at that time will become active. Sensors should already be in position on the seed tubes. Channels that are not connected to sensors while this button is pressed, will be deactivated. If the main signal plug on the hitch is not plugged in, there will be no active channels or any alarm. Before the power is switched on, connect all relevant plugs and connections.

## 4.5 Power off button

Switches off the power to the planter monitor.

## 4.6 Alarm acknowledge button

When pressed during an alarm condition, the alarm goes from continuous mode to an intermittent alarm. Alarm indicating lights at the individual channels are also lit up to identify the channel(s) causing the alarm.

# 5 Installation

## 5.1 Mounting of the Planter Monitor

Mount your Planter Monitor with the aid of the anchoring points which are part of the feet of the control unit. Identify a suitable and viewable position on the tractor.

Drill the necessary holes on each side of the control unit for mounting the black plastic anchoring blocks. Mount each black block by fastening it with pop rivets. (Ensure that the mounting procedure does not damage any part of the tractor.) Now the control unit can be fastened, using two cable ties. (Cut the cable ties after the planting season and store the control unit in a safe place.)



Horizontal “table” mounting





Horizontal "ceiling" mounting



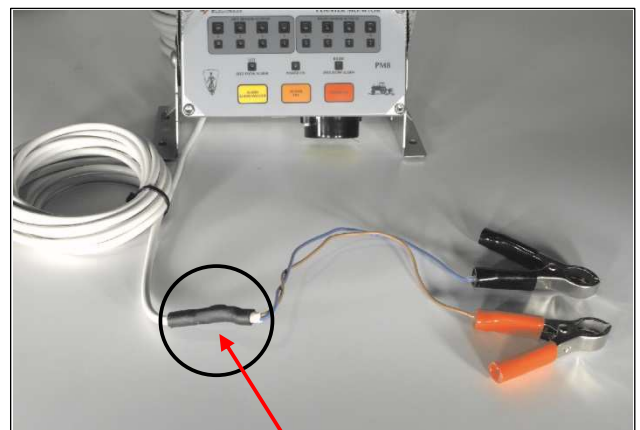
Vertical surface mounting



Remove sticker for louder alarm sound

Identify a 12V power source on the tractor. The unit can be powered from the battery via the battery clamps which are provided. At the point where the brown and blue wire goes into the white outer sleeve, an electronic auto-resetting fuse is built in for safety. Do not open or remove it.

The intensity of the alarm sound can easily be adjusted by simply sticking a small piece of adhesive tape over the buzzer's hole. It could be partially closed off if needed. In most cases the alarm is left open on open tractors, and closed by adhesive tape (e.g. isolation tape) when used in the cab of a tractor.



Inline electronic fuse resets automatically. Do not replace or remove.

## 5.2 Installation of high-rate seed flow sensors (D18 Pro)

### 5.2.1 Precision type seed tubes

The seed flow sensors must be mounted on the seed tubes with cable ties. The Precision type seed tube has a specially made area to accommodate the sensor-pair. Use the model of precision seed tube with the 18mm hole. Position the sensor set in such a way that the long signal cable is placed at the front of the seed tube.

Precision Seed tubes do not need drilling. They are manufactured with precision holes.



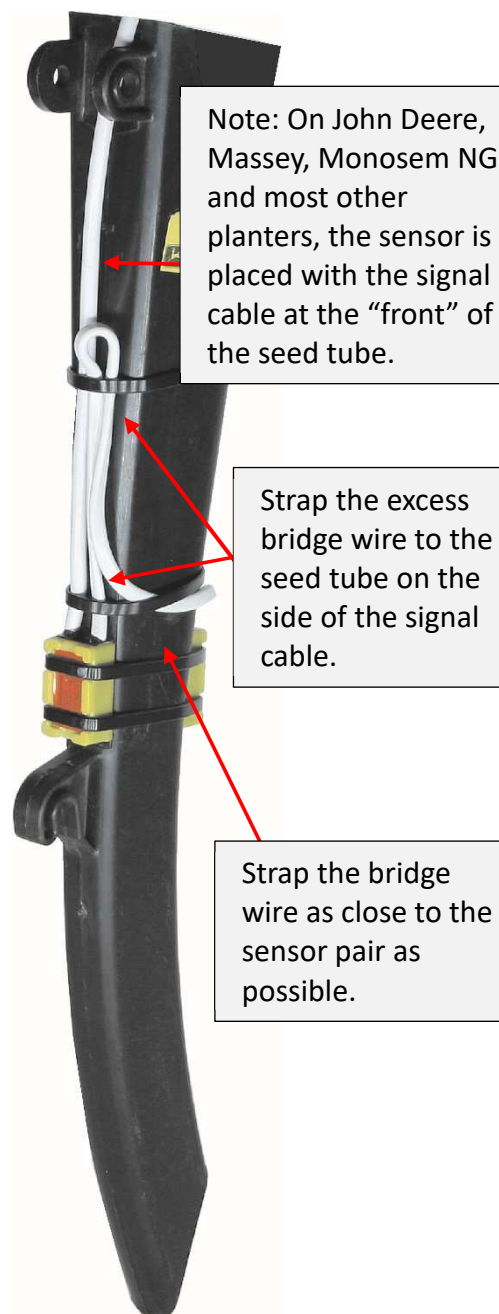
Fasten the bridging wire close to the sensor, as in the photo.



## 5.2.2 Standard seed tubes

Most of the popular planters have plastic seed tubes with a special flat surface to accommodate the sensor-pair. Identify a position where the sensor pair is to be mounted. Plan the two holes to face each other exactly. Drill an 18mm hole through the seed tube on each side as indicated in the photos. As a result of the drilled holes in the seed tube, burr is formed on the inside of the tube. It is very important that the burr is removed before the sensors are mounted. Use a file and a carpet knife to remove it. Place the sensor in position and tie it to the seed tube with two cable ties. Tie the bridge wire also to the seed tube in order to prevent it from damage. Follow the photo example closely. Route the sensor cable carefully through the frame of the planter. Try not to place it where it could be stepped upon or be damaged otherwise. Use cable ties to fasten the cables to the frame of the planter.

John Deere seed tube



The 18mm woodworking drill bit can be supplied by your local hardware shop or obtained from Electrolee.



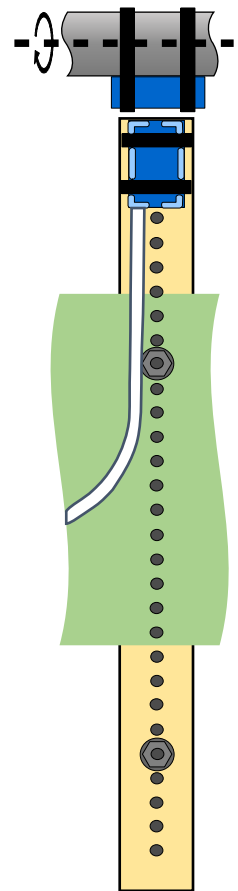
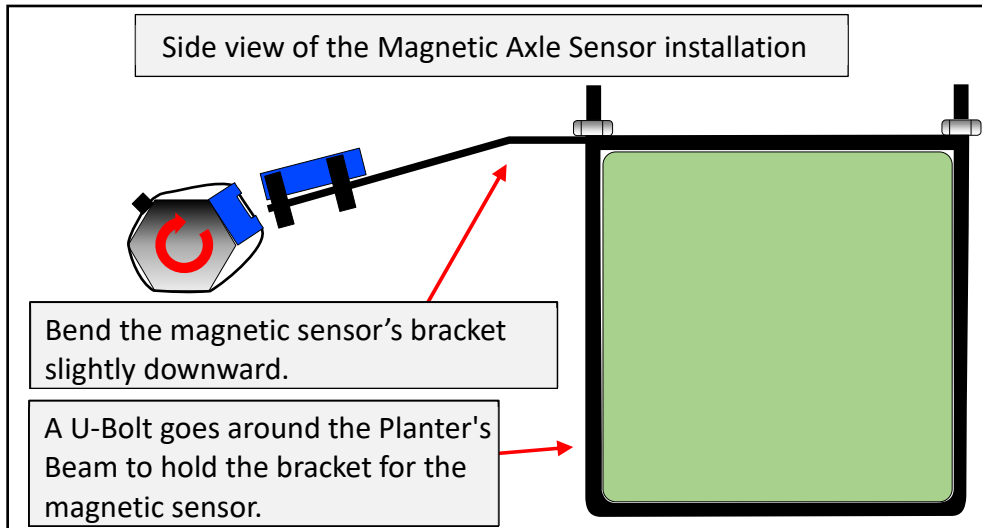
Please make sure to align the holes of the sensor pair when drilling the holes.



## 5.3 Installation: Magnetic axle rotation sensor (MGS 07)

These sensors are used mostly to monitor the rotation of the fertilizer axle drive. This is accomplished by fixing the magnet to the specific axle with cable ties. The magnet then rotates with the axle. Each rotation of the axle causes a flash on the monitor, at the corresponding channel.

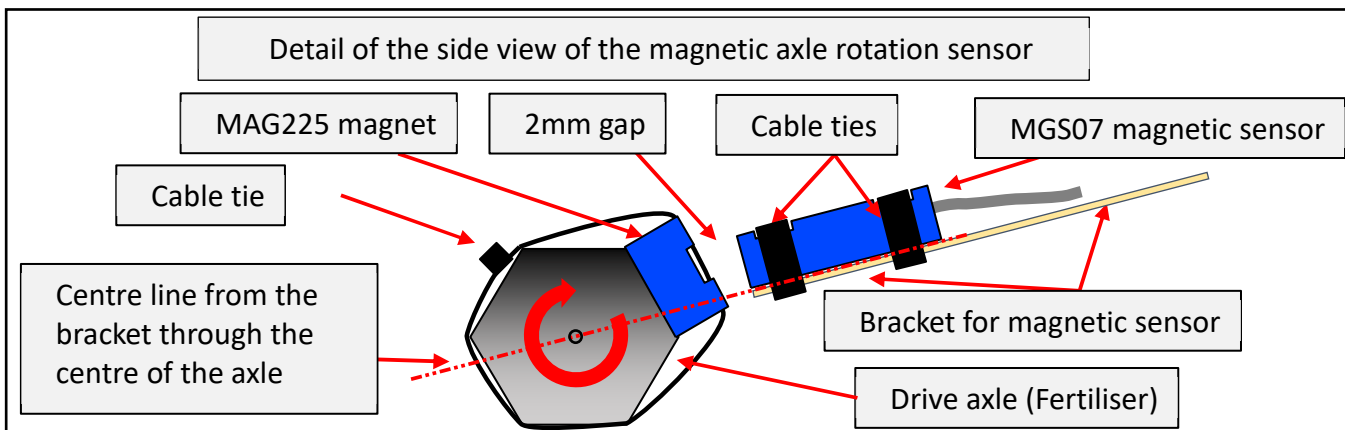
The magnetic sensor is mounted in the vicinity of the magnet near the pathway of the magnet around the axle. Study the sketch and follow it cautiously. Pay attention to the fact that a projected line from along the side of the bracket will go through the centre of the axle.



Where bins of granular fertilizer are driven from the middle of the planter outwards, it is best to monitor the axle rotation on the far end of the linked axle. When a link in the axle breaks, the magnetic sensor will monitor it.

It is very important to use the specially manufactured bracket to fit the magnetic sensor. It is specially manufactured on the end where the sensor is to be attached.

The bracket may be cut shorter where necessary, but the sensor-end of the bracket must be used as supplied. This is not to intervene with the magnetic sensor's magnetic field.



## 5.4 Installation: Granular fertiliser sensor (Oval/50-60mm Round)

The figure below shows where the sensor should be placed. Make sure that there is enough space for the sensor and place the sensor as far away from the cutting wheel as possible. Leave enough space to install the fertiliser's discharge pipe. The discharge pipe must not let any light through as it must be dark for the sensors to work accurately.

Attach the sensor with pipe clamps and route the cable over the planter's frame. It may be necessary to clean these sensors occasionally. This will depend on the type of fertiliser used, as well as the weather conditions.



## 5.5 Installation: Hit sensor for Air-seeder Planters (HIT-R4)

The Hit Sensor is an excellent solution for those who want to monitor seed or fertiliser flow, using a reliable and cost-effective method. It can be easily installed on one or all of the distribution pipes.

Installation consists simply of drilling a 6mm hole through the plastic distribution pipe, followed by tying the sensor and cable to the pipe using cable ties. Position the Hit Sensor where the pipe has the largest bend, since this is where the flow is concentrated. This ensures a high hit rate.

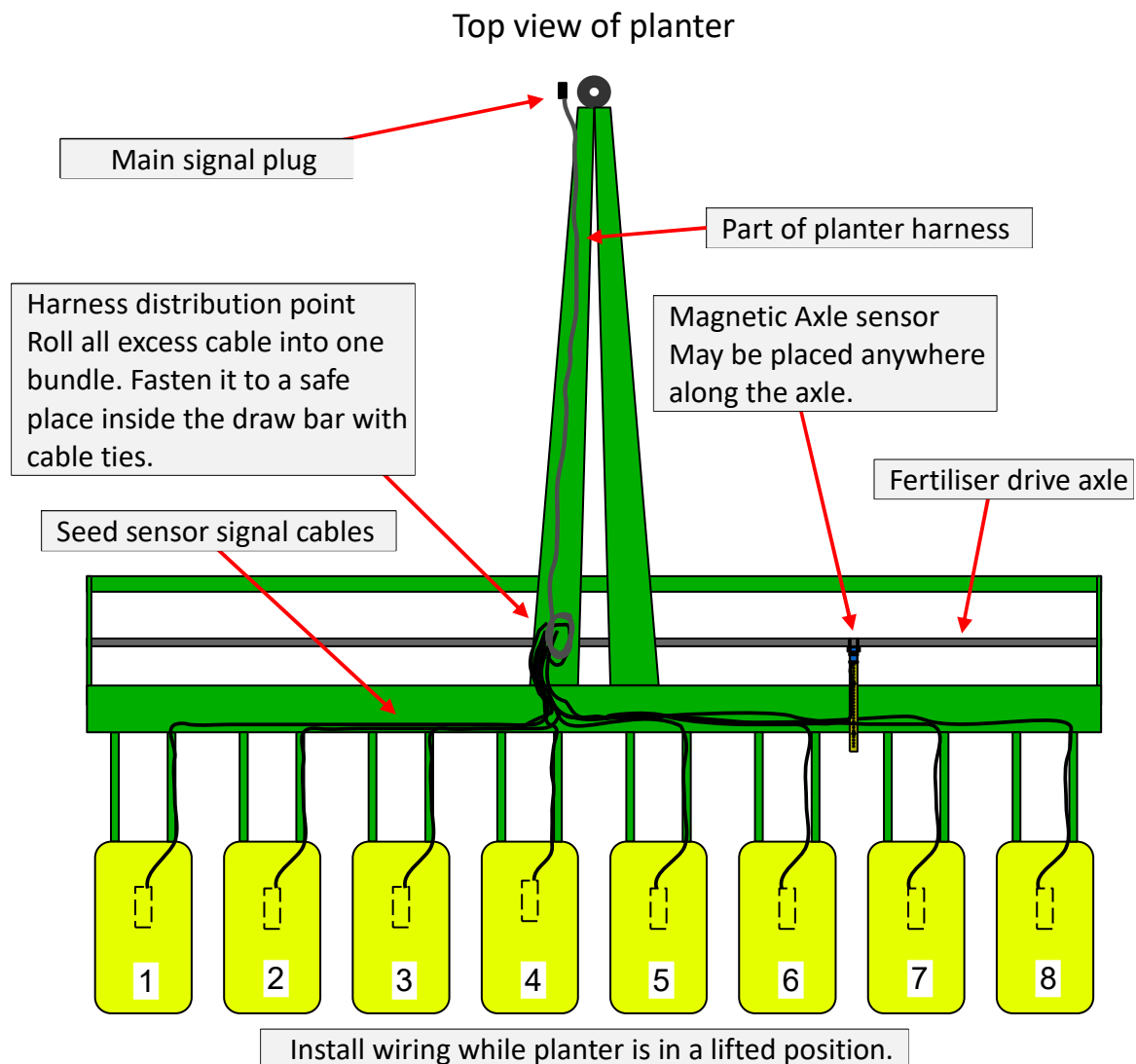


## 5.6 Installation: Lift Switch

The flexible spring type Lift switch is used to determine whether an implement has been lifted. Mount the Lift switch where the flexible part will be pushed upwards by a beam on the planter when it is in the lifted position. The signal from the Lift switch will be used to silence the Planter Monitor alarm until the planter is lowered again.



## 5.7 Installation: General planter wiring diagram



As you allocate sensors to the different channels, mark the plug with the appropriate channel number using a permanent marker. This helps to plug the sensors into the correct channels.

The channels on the main harness are marked from channel 1 up to the last channel. Start at channel 1 to fill channels with seed rows. If other items are also monitored, put them at the higher channel numbers. Extension cables are available if it is needed.

Where the Digital Unit is implemented, the channel with the highest number is internally connected to the Digital Unit. This channel must be plugged into an axle rotation sensor that is going to record distance. The particular axle must also be one that stops turning when the planter is not planting. In this way only the worked area will be recorded by the monitor.

Extension cables are available if necessary.



## 6 Maintenance

### 6.1 Maintenance of the sensors

It is important to clean the sensors with a brush daily. A clean sensor is an accurate sensor! An inexpensive, suitable brush can be made by fixing an old toothbrush to a 30 to 40 cm dowel stick. A bottle brush with a reasonable long handle can also be used. A good time to clean the sensors is in the evening after a day's work. Pour water down the seed tube while brushing both parts of the sensor-set. In this way the seed tube gets time to dry overnight.

### 6.2 Maintenance of electric connections

Keep the main electrical connection between the tractor and the planter as dry as possible. Should it get wet, spray a water repellent aerosol electrical cleaner on the contact pins and shake the excess fluid out. In this way the life of the electrical contact is much prolonged.

If the connection pins get exposed to an aggressive chemical like fertilizer, it should be flushed with clean water and then sprayed with a water repelling electrical contact cleaner. It is also advisable to spray electrical contact cleaner into the plug before the system is stored. This will help to protect the exposed contact points against corrosion.

The sensors that are plugged in on the harness will not easily oxidise because they are plugged in and sealed against the environment. If they are sprayed however the life of the plugs will also be prolonged.

### 6.3 Maintenance of control buttons

Only use the fingertip when pressing a button. Never press any of the buttons with a hard pointed object.

### 6.4 Maintenance in general

If the planter is sheltered during the non-planting season, the sensors may be left on the planter. Should the planter, however, have no protection against sun and rain, the effectiveness of the electrical connections may weaken. Prolonged sunlight could also have a harmful effect on the plastic parts. It is advisable to remove the Planter monitor control unit from the tractor at the end of the planting season. Store it in a dry place away from direct sunlight to maximize the service of your Planter monitor.



## 7 Implementing the Planter Monitor

Ascertain that all the appropriate sensors are connected to the distributing harness on the planter. All sensors and seed bins must also be in position. Then connect the main electrical connector and connect the power to the 12 V battery of the tractor. Press the *Power on* button. Since the tractor isn't moving, an alarm will sound. Press the *Alarm acknowledge* button. All the channel alarm (red) lights will light up to indicate that no channels register any activity. The alarm sounds intermittently to serve as a reminder that there is no activity at those sensors.

Adjust the angle of the Planter monitor in order to have a comfortable view of the monitor. The system is now ready for use.

When using the system, the monitor will give an alarm when turning at the end of the line. This is normal as the monitor reports the disruption of seed flow.

However, the moment the planting process continues, the alarm will stop and the seed flow indicating lights will indicate normal seed flow.

## 8 Troubleshooting

Nr	Issue	Cause	Action
1	Power light stays off regardless of the planter monitor being switched on.	1) Battery polarity is wrong.	Change the 12V power's polarity.
		2) At the point where the power is tapped, there is a contact problem.	Use a temporary alternative 12V power supply point to ascertain if the monitor switches on. Make sure proper contact is being made to ensure proper functioning of the monitor.
2	The Planter Monitor switches off itself.	There is a short to the chassis of the planter.	Go through every millimetre of wiring, looking for a small piece of broken isolation or a place it was nipped. This can be a very small area. It can temporary be repaired by yourself. All wires that are reconnected must be soldered and isolated. Preferably it must be sent to ELECTROLEE for repair.
3	The Monitor switches on (power light) but without any alarm.	The main signal cable is not plugged in. (Or none of the sensors are plugged in on the harness.)	Plug in the main signal cable and make sure all the channels that should be active are plugged in. Channels that are intended to be inactive must stay unplugged.
4	One or more of the channels are simply dead.	The signal cable, harness or main signal plug has been damaged.	Look for the place where the wire has been damaged. See if it can be repaired yourself. (Always solder and isolate the broken cable if possible.) The best is to send it to ELECTROLEE for repair.
5	The monitor works normally but no alarm can be heard.	The alarm unit has been broken.	Send the Planter Monitor to ELECTROLEE for repair.

## 9 Specifications

The control unit	
PM8	8 Universal channels
PM8+2	10 Channel monitor. 8 Universal channels and 2 channels restricted to magnetic axle sensors
PM14	14 Universal channels
PM22	22 Universal channels
PM26	26 Universal channels
Power supply	11,8V to 15V (0,75A max.)
Operating temperature	5°C to 65°C
Cable length from control unit to main signal cable connector	4,3m
Cable length of distributing harness to connector	4,3m
Cable length of every sensor	4,3m
Cable length of power cable	4,3 m
Time before alarm sounds	2 sec.
Alarm sound intensity	85 dB @ 300mm
<b>Sensors</b>	
D18 PRO	Used on typical plastic seed tubes with a 2mm wall thickness. The sensor fits into a 18mm hole. (e.g. JD7200) Monitors almost all types of grain seed.
D93B PRO	Mostly used to monitor granular fertilizer flow. It fits into a 9mm hole. Can be used on applications with a wall thickness of up to 3 mm.
MGS 07	Used in conjunction with the MAG225 magnet. This combination is used for sensing axle rotation. Always use the standard steel bracket for the mounting of the magnetic sensor. More than one magnet can be used on an axle.
HIT 20x5	Hit sensor for air seeders.

# Warranty

ELECTROLEE CC warrants this Planter/Process Monitor, purchased from ELECTROLEE CC or approved dealer, to be of a high quality and undertakes to replace or repair as it may decide and free of charge at ELECTROLEE CC's premises, any component (other than cables and/or electrical plugs) or the article itself, should it be found and brought to ELECTROLEE CC within three years from date of purchase, that any component or article itself is defective due to defects in workmanship or materials used in its manufacture.

This warranty does not cover:

1. Damage resulting from incorrect installation, or calibration, or use other than the designed use, or other than in accordance with the operating instructions issued by ELECTROLEE CC.
2. Any kind of consequential damage.
3. Abuse or neglect of the article.

The purchaser must deliver the article to ELECTROLEE CC, with proof of purchase, stating the date and serial number of the Planter Monitor, at the premises of ELECTROLEE CC, for inspection and the carrying out of any repairs, if necessary.

# Liability

ELECTROLEE CC will not be liable for any losses incurred whatsoever, whether directly or indirectly, due to the use, misuse, or purchase of the ELECTROLEE Planter/Process Monitor.

Also see our Standard terms and conditions for sale, available on request.

---

All rights reserved

Information regarding the products mentioned in this publication can change without prior notice

MANUFACTURED IN SOUTH AFRICA  
ELECTROLEE CC  
PO BOX 1015, WINGATE PARK, 0153  
INTERNATIONAL TEL +27 12 345 3193