

Installation and Operating Instructions

DRILLMAT III



Version: V.20150731



30283615-02-EN

Read and follow these operating instructions.

Keep these operating instructions in a safe place for later reference.

Legal notice

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Müller-Elektronik GmbH & Co.KG

Franz-Kleine-Straße 18

33154 Salzkotten, Germany

Germany

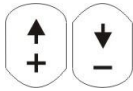







Tel: ++49 (0) 5258 / 9834 - 0









Fax: ++49 (0) 5258 / 9834 - 90

Email: info@mueller-elektronik.de

Website: <http://www.mueller-elektronik.de>

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1 System description

The DRILLMAT III is used to monitor the seeder, to determine the working data and for tramline switching.

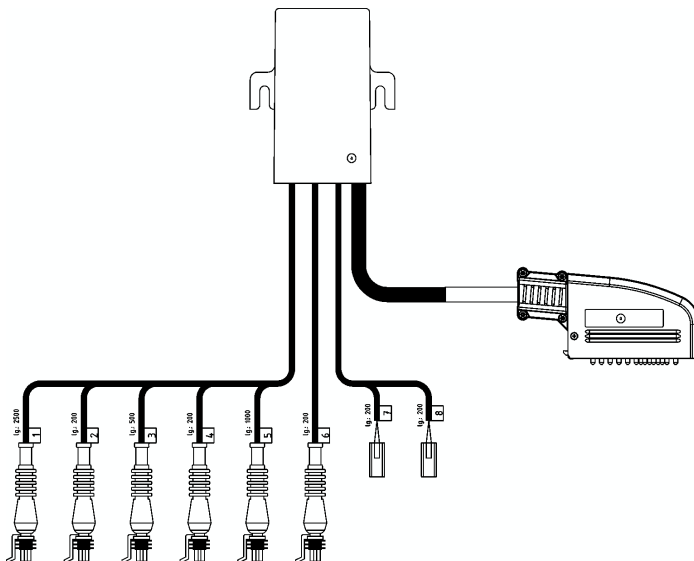
Basically the DRILLMAT III consists of:

- The board computer (installed in the cabin of the tractor) for the entry of the data required. It also serves as a monitor. In the case of a fault, an acoustic and optical alarm is set off.
- The machine wire harness (installed on the seeder) with a connecting cable to the on-board integrated display/controller.

With wheel sensor

- Sensor for monitoring metering shaft
- Sensor for monitoring the fan
- Fill level sensor
- Sensor for monitoring bout marker

1.1 Cable harness



1.1.1 Connector pin assignment

| bout marker (1) | | Level (2) | | Wheel sensor (3) | | Metering shaft (4) | |
|-----------------|------------|--------------------------|------------|-------------------|------------|--------------------|------------|
| Pin | Color | Pin | Color | Pin | Color | Pin | Color |
| 1 | White (ws) | 1 | White (ws) | 1 | White (ws) | 1 | White (ws) |
| 2 | Brown (br) | 2 | Brown (br) | 2 | Brown (br) | 2 | Brown (br) |
| 3 | Green (gn) | 3 | Green (gn) | 3 | Green (gn) | 3 | Green (gn) |
| Fan (5) | | Pre-emergence marker (6) | | Left tramline (7) | | Right tramline (8) | |
| Pin | Color | Pin | Color | Pin | Color | Pin | Color |
| 1 | White (ws) | 1 | Blue (bl) | --- | Blue (bl) | --- | Blue (bl) |
| 2 | Brown (br) | 2 | Brown (br) | --- | Brown (br) | --- | Brown (br) |
| 3 | Green (gn) | | | | | | |

1.1.2 Scope of delivery

- Cable harness
- Sensors
 - Bout marker
 - Fill level
 - Wheel
 - Metering shaft
 - Fan
- Installation materials

1.2 Computer and basic equipment



2 Safety instructions

2.1 Intended use

- The DRILLMAT III is specified exclusively for agricultural use. The manufacturer takes no responsibility for any installation or application outwith this area.
- The manufacturer cannot be held liable for any personal injury or property damage resulting from such improper use. In such cases all risks are the responsibility of the user.
- Intended use also includes compliance with the conditions for operation and repairs prescribed by the manufacturer.
- All applicable accident prevention regulations and all other generally recognized safety, industrial, and medical standards as well as all road traffic laws must be observed. Any unauthorized modifications made to the equipment will void the manufacturer's warranty.



2.2 Basic safety instructions

Observe the following recommended precautions and safety instructions:

- Never remove any safety mechanisms or stickers.
- Before using the DRILLMAT III, read and understand this guide. It is of equal importance that other operators also read and understand the manual.
- During maintenance or when using a battery charger, switch off the power supply.
- Unauthorised opening of the device leads to the loss of any warranty claims.
- Never service or repair the device when it is switched on.
- When welding on the tractor or on an attached machine, interrupt the power supply to the DRILLMAT III.
- Only use a cloth with clear water or a little glass cleaning agent to clean the DRILLMAT III
- Press the keys with your fingertips. Avoid using your finger nails.
- Should any part of this guide remain incomprehensible after reading, contact your dealer or Mueller-Elektronik Service for further clarification before using the DRILLMAT III
- Read carefully and observe all safety instructions in the manual.
- Learn how to operate the DRILLMAT III correctly. Do not allow anyone to operate the machine without exact instructions.
- Keep the DRILLMAT III and the spare parts in good condition. Unauthorized modifications or use may impair operability and/or safety and reduce the service life of the unit.

2.3 Layout and meaning of warnings

All safety instructions found in these Operating Instructions are composed in accordance with the following pattern:

| | |
|---|----------------|
|  | WARNING |
| <p>This signal word identifies medium-risk hazards, which could potentially cause death or serious physical injury, if not avoided.</p> | |
|  | CAUTION |
| <p>This signal word identifies hazards, which could potentially cause minor or moderate physical injury, if not avoided.</p> | |

NOTE

This signal word identifies hazards, which could potentially cause damage to property, if not avoided.

2.4 Safety notice for the subsequent installation of electrical and electronic devices and/or components

Agricultural equipment used today features electronic components and parts whose function can be affected by other farm equipment which emits electromagnetic waves. Such effects could lead to personnel being put in danger, if the following safety instructions are not adhered to.

When subsequently installing electrical and electronic devices and/or components in a machine with a connection to the electrical system, the user must take sole responsibility for testing the installation for interference with vehicle electronics or other components. This applies, in particular, to the electronic control of:

- electronic hitch control,
- front lifting gear,
- power take off (PTO),
- engine,
- gear.

Above all it must be ensured that all subsequently installed electrical and electronic components comply with the current version of the EMC directive 2004/108/EC and carry the CE symbol.

The following requirements must be met in order to retrofit mobile communication systems (e.g. radio, phone):

- Only approved devices complying to national regulations (e.g. BZT approval in Germany) are to be installed;
- The equipment must be installed as a fixed installation.
- The use of portable or mobile devices inside the vehicle is permissible only via a connection to the permanently installed outside antenna;
- The transmitting unit is to be installed in a position away from the vehicle electronics;
- An antenna should only be installed professionally ensuring that there is a good earth connection between the antenna and the vehicle chassis.

Please refer to the manufacturer's instructions for cabling and installation as well as for the maximum current consumption.

3 EC declaration of conformity

This product has been manufactured in conformity with the following national and harmonised standards as specified in the current EMC Directive 2004/108/EC:

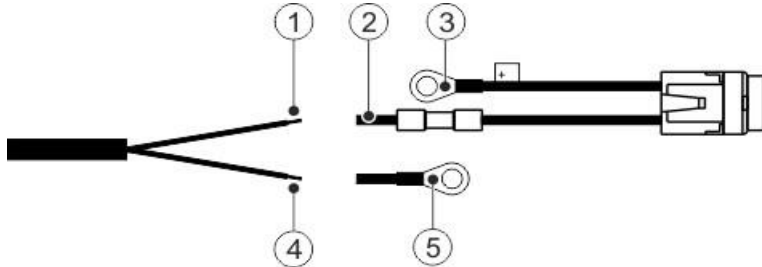
- EN ISO 14982

4 Installation Instructions



4.1 On-board computer



The computer is to be installed together with the console within the driver's field of visibility. The distance from the radio equipment or radio antenna should be at least 1 meter.

4.2 Battery connection cable



| | | | |
|---|--------------------------------|---|-------------------------------|
| ① | brown cable core | ④ | blue cable core |
| ② | Free end of the butt connector | ⑤ | Loose ring tongue – ground/0V |
| ③ | Ring tongue +12V | | |

| | |
|---|---|
|  |  WARNING |
| | <p>Risk of injury caused by short circuit Connecting the positive terminal and the vehicle mass when working on the battery terminals can cause a short circuit. This can cause burn injuries to persons.</p> <ul style="list-style-type: none"> ◦ When working on the battery terminals, ensure that no connection is created between the vehicle battery and the vehicle mass. ◦ Remove metallic items such as watches and rings before starting work. ◦ When disconnecting the terminals, always begin with the negative terminal. ◦ Always begin reconnecting the terminals with the positive terminal. |

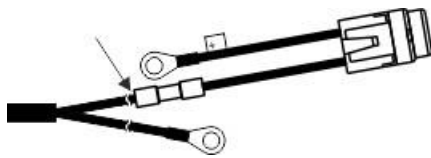
| | |
|---|---|
|  |  WARNING |
| | <p>Danger of injury from explosion of the vehicle battery If the battery terminals are loose fitting, starting the vehicle can cause the vehicle battery to overheat. The vehicle battery may then explode.</p> <ul style="list-style-type: none"> ◦ Always tighten the battery terminals firmly after assembly. |

NOTE

Damage to the vehicle's electrical system
Switching the polarity of the cables can cause damage to the vehicle's electrical system.

- Pay attention to the polarity of the cable cores and the terminals.

- > Ensure that the vehicle is switched off.
- > Insert the blue cable core ④ into the 0V ring tongue ⑤
- > Insert the brown cable core ① into the free end of the butt connector ②.
- > Pinch with a crimping tool.



- > Shrink both of the butt connectors with a heat source (e.g. hot air gun) until the adhesive emerges.
- > Connect the ring tongue to the battery terminal of the vehicle battery. Pay attention to the polarity, start with the positive terminal.
- > Fasten the battery cable with the cable ties. Ensure that there is sufficient distance from moving parts and parts generating large amounts of heat.

Operating voltage is 12 V and must be taken directly from the battery or from the 12-volt starter. Care should be taken when laying the cable and it should be shortened if necessary. The crimp ring terminal for the ground line (blue) and the end sleeve for strands for the + line (brown) should be fitted using suitable pliers. The end sleeve for strands for the + line are in the connection clamp of the fuse holder.

brown = + 12 Volt

blue = ground

NOTE

The negative pole on the battery must be connected to the tractor's chassis.

4.3 Junction box on the machine

The wire harness and the sensors are factory installed.

4.4 Sensors

Wheel sensor (hall element sensor)

The wheel sensor is used to determine the distance covered as well as the area.

The tube clip and magnet are mounted on to the wheel. The red side must point towards the sensor. The sensor is to be mounted to the magnets on the fixture provided at a distance of 5-10mm. A connector is provided for each lead in the wire harness.

Metering shaft speed sensor (reed contact sensor)

This sensor monitors the function of the metering shaft.

The tube clip and magnet are mounted on to the metering shaft. The red side must point towards the sensor. The sensor must be mounted to the fixture provided at a distance of approximately 20 mm.

Fill level sensor (capacitive sensor)

This sensor controls the seed bin.

As soon as the surface is no longer covered with grain, the sensor switches on and the computer sends out an alarm signal.

The sensor should be placed in the seed bin, so that it switches on as soon as the set amount of residue is reached. The end of the sensor should protrude 20mm from the screw fitting.

The sensitivity can be regulated at the back of the sensor. If the sensor switches on, the lamp on the sensor lights up.

Bout marker (reed contact sensor)

This sensor indicates to the computer that the row markers have been switched.

The sensor is to be mounted on to a static fixture opposite the switch mechanism for the row marker. The magnet is to be mounted on to the switch mechanism opposite the sensor at a distance of 20 mm. The magnet must momentarily be lead past the sensor when the row indicator switches. Its end position should not be in front of the sensor.

The tramline meter moves on one position each time the row marker switches on.

Seeder without bout marker

The switch impulse is picked up when the top link is raised. The magnet and sensor should be mounted so that they approach each other in a raised position at roughly 20 mm.

In working position the distance must be at least 40 mm.

Fan speed sensor (hall element sensor)

Rpm monitor on the fan

Both magnets are to be mounted to the fixture provided. The red side must point towards the sensor. The sensor must be mounted at a distance of 5-10 mm to the sensors.

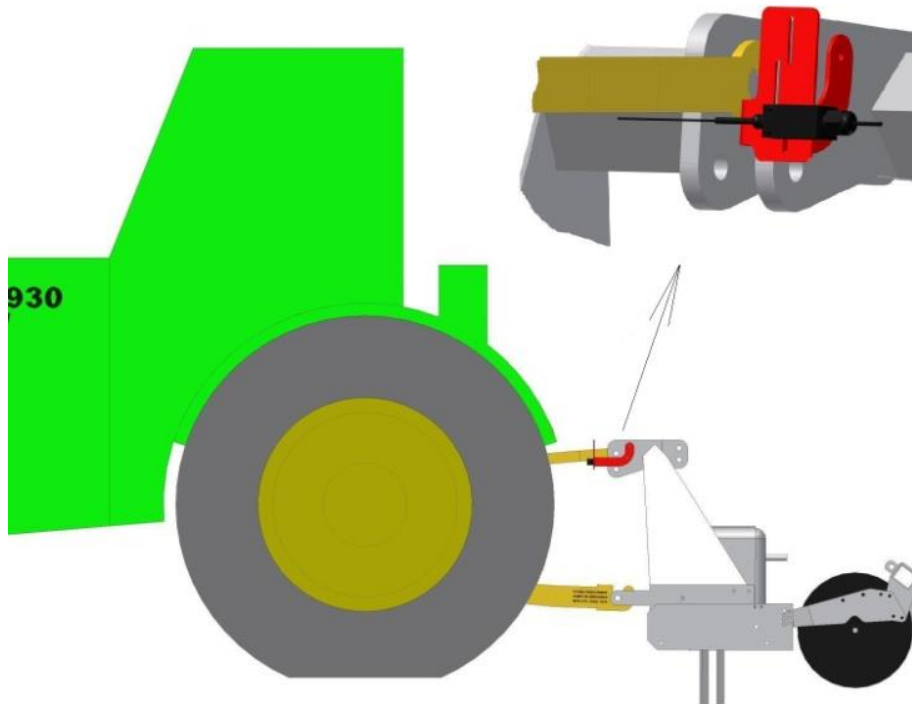
Mechanical sensor for tramlines- used by PNEUSEJ

In case, that you have electronic Drillmat III for tralines on a sowing drill, the mechanical sensor has to be assembled on a machine which is on a 3 point linkage of tractor.

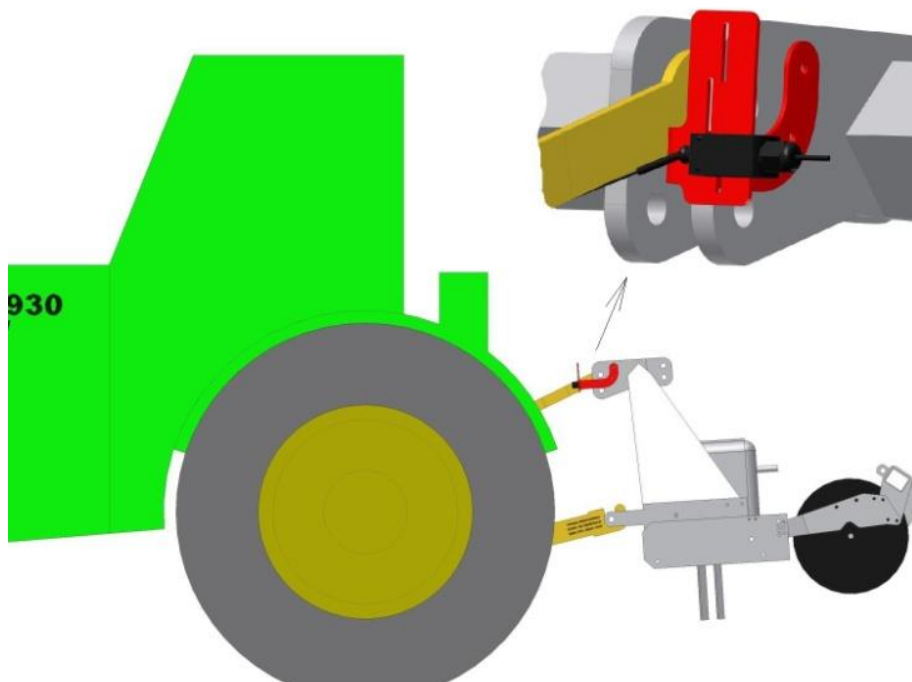
1. If a sowing drill is directly connected with a tractor, the mechanical sensor is assembled on the sowing drill in factory and you have to only adjust it according pictures A and B.
2. If a sowing drill is connected with a power harrow or other machine for preparing of seedbad,you have to assemble the mechanical sensor on the machine (power harrow or other) and you have to also adjust that according pictures A and B.

Assembling of the mechanical sensor - used by PNEUSEJ

- A. Working position – The mechanical sensor has to be turn off. It means that a spring on the sensor has to be in standard position.



- B. Transport position – The sensor has to be turn on. It means that the spring on the sensor has to be bent.



5 Operating Instructions

5.1 Initial operation

The device carries out a self-test when switched on. After completion the function last used before switch-off is automatically selected.



In the case of an electronic fault the device displays: "HALP 00" or "HALP 88". In this case return the device for repair.

5.2 Description of the entry keys

The keyboard has two colours:

- White keys - function keys (display the recorded data)
- Gray keys - entry keys (enter the machine data) and control keys

5.2.1 Setting keys +/-





When the keys  or  are pressed the display moves one position in the direction required. Each time the key is pressed, the display moves on until the key is released.

The board computer requires the following machine data in order to operate at all:

- Impulses/100m
- Working width
- metering shaft speed
- tramline rhythm

5.2.2 "Working width" key

This key is used to enter the actual working width:

- Press 
- Select value using the keys  and 
- Press 





Finally control the value entered once more by pressing the "working width" key.




5.2.3 "Impulses/100m" key

With this key the number of impulses recorded to the computer by the wheel sensor during a journey of 100m is entered.

There are two possibilities to enter the data:

1. The impulse/100 m value is known

- Press 
- Select value using the keys  and 
- Press 

2. The impulse/100 m value is not known
- Measure out and mark a distance of 100 m on the field
 - Bring the vehicle in to start position
 - Press  and  simultaneously.
 - Travel a distance of 100m
 - Press 



5.2.4

"RPM" key





With the initial operation the fan's rated rpm must be communicated to the computer.

Enter as follows:

- Start up the machine
- Press  (current rpm will be displayed).
- Press 

The value displayed at this moment in time is saved as the rated rpm.

If monitoring is to be switched off, the following entry is required:

- Press  (display 0)
- Press 
- Rpm monitoring is now switched off

The rpm alarm is displayed by a hooting sound and the flashing of the arrow above the rpm display every second. With the metering shaft alarm this occurs every 5 seconds.

5.2.5

"Tramline rhythm" key



Tramlines can be laid out automatically using the DRILLMAT. For this purpose the corresponding coulter must be closed. The working widths of the seeder and the cultivator have to be taken into account. The tramline rhythm is calculated on the basis of these values.

Tramline rhythm = working width of sprayer / working width of seeder

Example:

You are using a field sprayer with a working width of 24m and a seeder with a working width of 6m. In this case the tramline rhythm is $24:6 = 4$.

The calculation results in even (2, 4, 6 etc.) and uneven (1, 3, 5 etc.) rhythms. In the case of even rhythms, the tramlines are usually laid out in 2 runs. As this tends to be more inaccurate, the even rhythms can be laid out in one run (S rhythms e.g. 4S; 6S etc.). However, it has to be taken into consideration that the first run is carried out with half the working width of the seeder and subsequently begins with position 1 of the rhythm.





Using standard rhythms you can also choose if only the inside, the outside or all tramline rows should shut off. This allows you to adjust to working with a tramline width of e.g. 1.50 m or 1.80 m or with broad tyres.

This is not possible when using double tramline rhythms. In this case you can only choose between beginning at the left hand boundary or the right hand boundary of the field.

Following rhythms are supported by the DRILLMAT:

| | Rhythm | Tramline left | Tramline right |
|-----|--|---------------|----------------|
| 0 | No tramline | 0 | 0 |
| -2 | 2 | 1, 2 | 0 |
| 2- | 2 | 0 | 1, 2 |
| 2A | 2 | 1, 2 | 1, 2 |
| 3 | 3 | 2 | 2 |
| -4 | 4 | 2, 3 | 0 |
| 4- | 4 | 0 | 2, 3 |
| 4A | 4 | 2, 3 | 2, 3 |
| 5 | 5 | 3 | 3 |
| -6 | 6 | 3, 4 | 0 |
| 6- | 6 | 0 | 3, 4 |
| 6A | 6 | 3, 4 | 3, 4 |
| 7 | 7 | 4 | 4 |
| -8 | 8 | 4, 5 | 0 |
| 8- | 8 | 0 | 4, 5 |
| 8A | 8 | 4, 5 | 4, 5 |
| 9 | 9 | 5 | 5 |
| -10 | 10 | 5, 6 | 0 |
| 10- | 10 | 0 | 5, 6 |
| 10A | 10 | 5, 6 | 5, 6 |
| 11 | 11 | 6 | 6 |
| -12 | 12 | 6, 7 | 0 |
| 12- | 12 | 0 | 6, 7 |
| 12A | 12 | 6, 7 | 6, 7 |
| -14 | 14 | 7, 8 | 0 |
| 14- | 14 | 0 | 7, 8 |
| 14A | 14 | 7, 8 | 7, 8 |
| 15 | 10 (20m/8m, 15m/6m) beginning on the right | 2, 9 | 4, 7 |
| 16 | 10 (20m/8m, 15m/6m) beginning on the left | 4, 7 | 2, 9 |
| 18 | 18 (18m/4m) beginning on the left | 3, 16 | 7, 12 |
| 19 | 18 (18m/4m) beginning on the left | 7, 12 | 3, 16 |
| 20 | 10 (20m/6m) beginning on the left | 2, 9 | 5, 6 |

| | | | |
|-------|--------------------------------------|-------|-------|
| 21 | 10 (20m/6m) beginning on the right | 5, 6 | 2, 9 |
| 22 | 6 (18m/12m) beginning on the left | 3, 4 | 1, 6 |
| 23 | 6 (18m/12m) beginning on the right | 1, 6 | 3, 4 |
| 24 | 16 (24m/4.5m) beginning on the left | 8, 9 | 3, 14 |
| 25 | 16 (24m/4.5m) beginning on the right | 3, 14 | 8, 9 |
| 26 | 18 (27m/6m) beginning on the left | 3, 16 | 7, 12 |
| 27 | 18 (27m/6m) beginning on the right | 7, 12 | 3, 16 |
| 28 | 14 (28m/8m) beginning on the left | 2, 13 | 6, 9 |
| 29 | 14 (28m/8m) beginning on the right | 6, 9 | 2, 13 |
| 2-S: | 2 symmetrical | 1 | 1 |
| 4-S: | 4 symmetrical | 2 | 2 |
| 6-S: | 6 symmetrical | 3 | 3 |
| 8-S: | 8 symmetrical | 4 | 4 |
| 10-S: | 10 symmetrical | 5 | 5 |
| 12-S: | 12 symmetrical | 6 | 6 |

To adjust the tramline rhythm press . The correct rhythm is then set with the setting keys  and . Finally the new rhythm is confirmed by pressing .

If the correct tramline has been adjusted and set to 1, the side of the field where work is to begin still has to be taken into account. With uneven and S rhythms, work can begin on either side of the field. With the even rhythms 4, 8 and 12, work must begin at the side where the closed row is, and with rhythms 6, 10 and 14 on the opposite side of the field.

In the case of the special rhythms no.15 - 29 the side of the field where work is to begin has to be decided first. "Beginning on the left" means that when starting the side of the field lies on the left hand side of the tractor in the direction of travel. Consequently "beginning on the right" is the other way round.

5.2.6

"+1" key



With this key the tramlines can be switched on further manually one step at a time.

5.2.7

"Start/Stop" key






With this key the automatic switching of the tramline rhythm can be stopped and released again.

When stopped, the arrow appears above the "Stop" symbol!



5.3 Description of the function keys

5.3.1 On/off device



Press  to switch the device on. Press  once more to switch it off.

Should the voltage supply drop below 9 volts, e.g. when starting the tractor, the computer switches off automatically. It can be switched on again by pressing .

5.3.2 "Start function"

Press the keys  and  to release the start function. This means that the memory for the area, time and distance is set to 0. The time is restarted automatically by pressing this key. This function is to be carried out at the beginning of each operation.



5.3.3 "Time" key

The operating time since carrying out the "start function" (see 5.3.2) is displayed by pressing this key. If the tractor is switched off and the computer voltage-free, the time data entry is stopped. It restarts once the device is switched on again. The clock can also be stopped during operation. After pressing  press it once again to stop the clock. To restart it, press  yet again.

5.3.4 "Area" key

The area covered since carrying out the "start function" (see 5.3.2) is displayed by pressing this key. Measurement is interrupted as soon as the computer stops receiving wheel impulses.

5.3.5 "Total area" key

This key is used to determine the total area for a whole season. Press the  and  simultaneously at the beginning of the season to set the memory to 0.

5.3.6 "Current area output" key

This key is used to determine the current area output in ha/h.

5.3.7 "Distance" key

The distance covered since carrying out the "start function" (see 5.3.2) is displayed by pressing this key.

5.3.8 "Speed" key

When this key is pressed the current speed travelled is displayed.

5.4 Operation process

Once the machine data have been entered (see 5.2), the following steps have to be carried out before operation can begin. The row marker at the beginning of the field is to be operated so that the right side is lowered.

Subsequently only the start function has to be carried out (see 5.3.2).

After that, each time the end of the field is reached and the row marker is switched, tramline switching is continued automatically. Even when the computer is switched off temporarily, the last position is stored. When the computer is switched on again, the last setting is still available. Drilling can be carried on immediately.

During the operation process area, total area, operating time and distance are determined and speed and performance are displayed.

6 Maintenance

6.1 On-board computer

The computer is maintenance-free. During the winter it should be stored at room temperature.

6.2 Sensors

The sensors are maintenance-free.



Error recovery

When trouble-shooting keep to the intended sequence!

| Error | Cause | Remedial measure |
|--|---|--|
| The device does not switch on | Incorrect power supply polarity | Check polarity |
| | Interruption in the power supply. | Check battery connection cable; control battery clamps and fuse |
| | Total failure | Send the computer to the manufacturer. |
| The computer displays HALP 00 or HALP 88 | Memory error | Send the computer to the manufacturer. |
| No speed is displayed | Missing pulse/100m input | Enter number of impulses/100m (5.2.3) |
| | The wheel sensor is not sending any impulses to the computer, the ring in the display is not flashing during the journey. | Set the distance between the wheel sensor and the magnet at 5-10mm. |
| | | The red site of the magnet must face the sensor. |
| | | Secure magnet with a non-magnetic screw. |
| | | Connect cable in the wire harness correctly green = gn = signal brown = br = + 12 volts white = ws = 0 Volt |
| | | Sensor is faulty, replace |
| | | Computer is defective, replace |
| Junction box is defective, replace | | |
| No area is shown | Working width not entered | Enter working width (see 5.2.2) |

