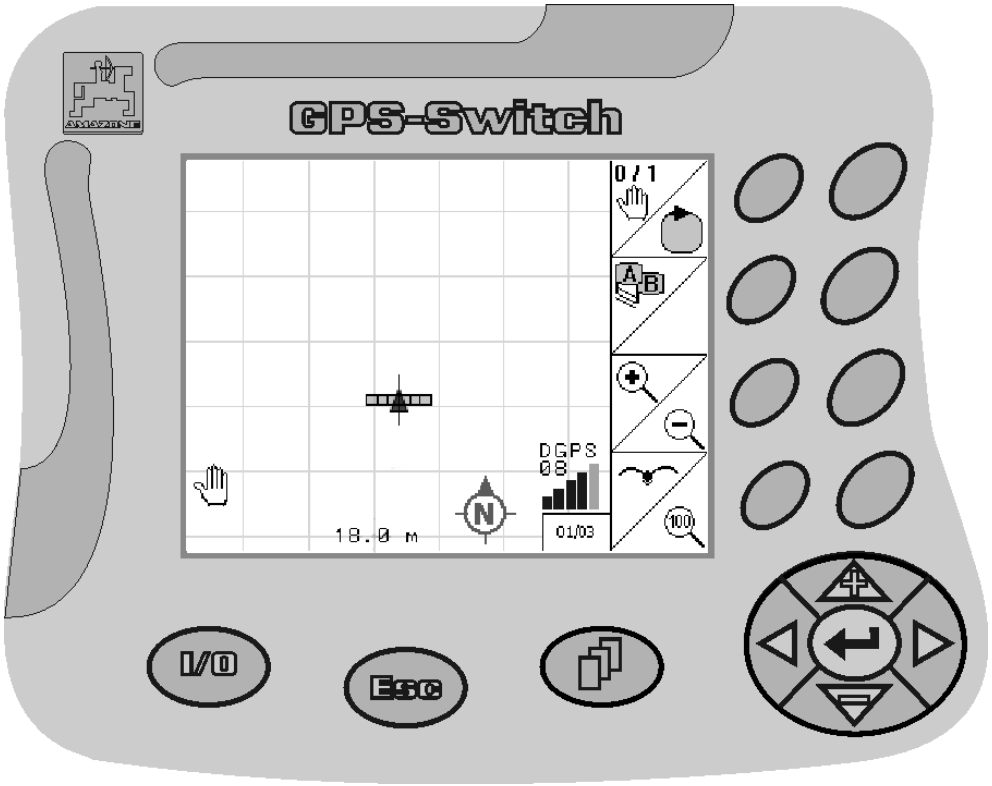
Operating Manual

AMAZONE

GPS-Switch

On-board computer



MG3442
BAG0059.8 11.12
Printed in Germany

**Please read this operating manual before first commissioning.
Keep it in a safe place for future use.**

en

Reading the instruction

Manual and following it should seem to be inconvenient and superfluous as it is not enough to hear from others and to realize that a machine is good, to buy it and to believe that now everything should work by itself. The person in question would not only harm himself but also make the mistake of blaming the machine for possible failures instead of himself. In order to ensure success one should enter the mind of a thing, make himself familiar with every part of the machine and get acquainted with how it's handled. Only in this way could you be satisfied both with the machine and with yourself. This goal is the purpose of this instruction manual.

Leipzig-Plagwitz 1872. Rud. Sark.

Identification data

Enter the machine identification data here. You will find the identification data on the type plate.

Machine identification number:
(ten-digit)

Type: **GPS-Switch**

Year of manufacture:

Basic weight (kg):

Approved total weight (kg):

Maximum load (kg):

Manufacturer's address

AMAZONEN-WERKE
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Spare part orders

Spare parts lists are freely accessible in the spare parts portal at www.amazone.de.

Please send orders to your AMAZONE dealer.

Formalities of the operating manual

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Foreword

Dear Customer,

You have chosen one of the quality products from the wide product range of AMAZONEN-WERKE, H. DREYER GmbH & Co. KG. We thank you for your confidence in our products.

On receiving the machine, check to see if it was damaged during transport or if parts are missing. Using the delivery note, check that the machine was delivered in full including the ordered special equipment. Damage can only be rectified if problems are signalled immediately!

Before first commissioning, read and understand this operating manual, and particularly the safety information. Only after careful reading will you be able to benefit from the full scope of your newly purchased machine.

Please ensure that all the machine operators have read this operating manual before commissioning the machine.

Should you have problems or queries, please consult this operating manual or give us a call.

Regular maintenance and timely replacement of worn or damaged parts increases the lifespan of your machine.

User evaluation

Dear Reader,

We update our operating manuals regularly. Your suggestions for improvement help us to create ever more user-friendly manuals. Send us your suggestions by fax.

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1 User Information

The User Information section supplies information on use of the operating manual.

1.1 Purpose of the document

This operating manual

- Describes the operation and maintenance of the machine.
- Provides important information on safe and efficient handling of the machine.
- Is a component part of the machine and should always be kept with the machine or the traction vehicle.
- Keep it in a safe place for future use.

1.2 Locations in the operating manual

All the directions specified in the operating manual are always seen from the direction of travel.

1.3 Diagrams used

Handling instructions and reactions

Activities to be carried out by the user are given as numbered instructions. Always keep to the order of the handling instructions. The reaction to the handling instructions is given by an arrow.

Example:

1. Handling instruction 1

→ Reaction of the machine to handling instruction 1

2. Handling instruction 2

Lists

Lists without an essential order are shown as a list with bullets.

Example:

- Point 1
- Point 2

Number items in diagrams

Numbers in round brackets refer to the item numbers in the diagrams. The first number refers to the diagram and the second number to the item in the figure.

Example: (Fig. 3/6)

- Figure 3
- Item 6

2 General Safety Instructions

Knowledge of the basic safety information and safety regulations is a basic requirement for safe handling and fault-free machine operation.

The operation manual

- Must always be kept at the place at which the machine is operated.
- Must always be easily accessible for the user and maintenance personnel.

2.1 Representation of safety symbols

Safety instructions are indicated by the triangular safety symbol and the highlighted signal word. The signal word (DANGER, WARNING, CAUTION) describes the gravity of the risk and has the following significance:

DANGER

Indicates an immediate high risk which will result in death or serious physical injury (loss of body parts or long term damage) if not avoided.

If the instructions are not followed, then this will result in immediate death or serious physical injury.

WARNING

Indicates a medium risk, which could result in death or (serious) physical injury if not avoided.

If the instructions are not followed, then this may result in death or serious physical injury.

CAUTION

Indicates a low risk which could incur minor or medium level physical injury or damage to property if not avoided.

IMPORTANT

Indicates an obligation to special behaviour or an activity required for proper machine handling.

Non-compliance with these instructions can cause faults on the machine or in the environment.

NOTE

Indicates handling tips and particularly useful information.

These instructions will help you to use all the functions of your machine to the optimum.

2.2 Safety instructions for the GPS-Switch

WARNING

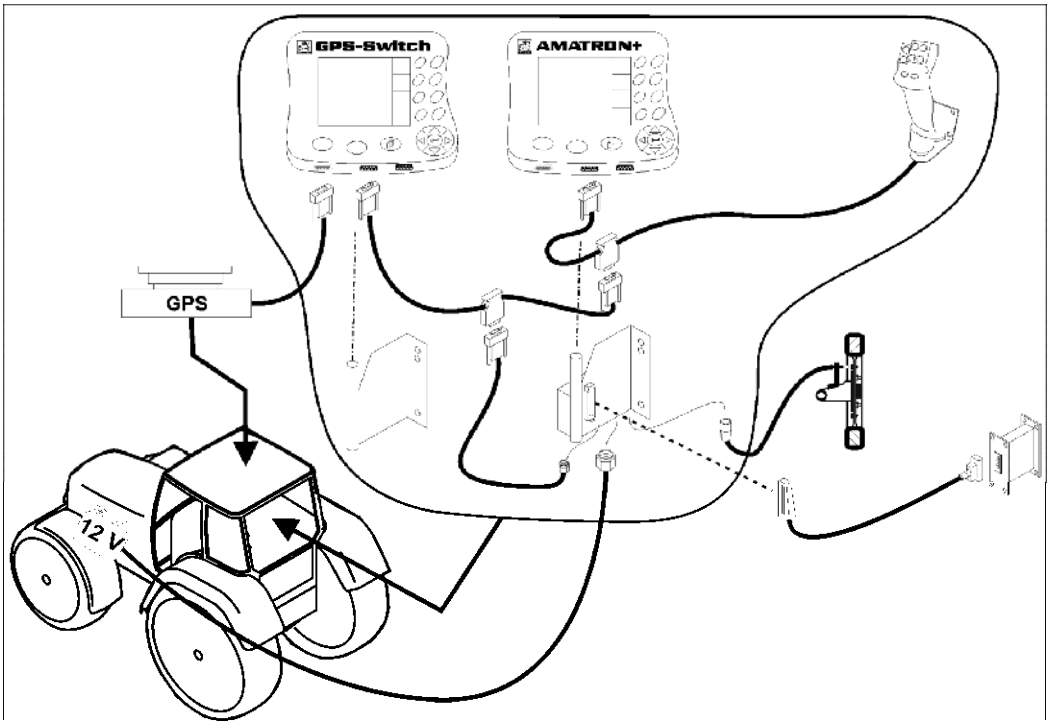
In automatic mode, the spread fan of the fertiliser spreader poses a danger to persons in the working area.

The danger may arise through the automatic opening of the shutter.

3 Installation instructions

3.1 Connection diagram

The tractor's basic equipment (console with distributor) must be installed to the right of the driver in the cab, within visual range and easy reach, so that it is vibration-free and electrically conductive. The distance from the radio unit or aerial must be at least 1 m.



The GPS switch software is designed so that the GPS antenna can be mounted on the tractor.

If the GPS antenna was previously mounted on the machine, for the calibration of existing reference points the altered antenna position must be taken into account - see page 47.

3.2 Connections on the GPS-Switch

Fig. 1/…

(1) Y-cable connection.

(2) GPS receiver connection.

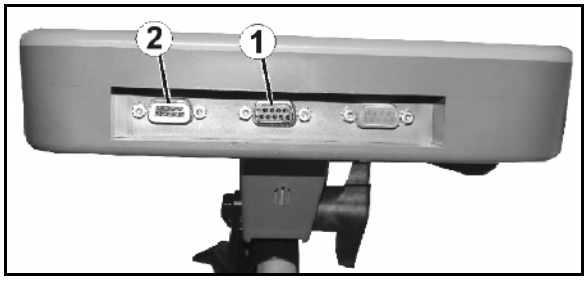


Fig. 1

4 Product description

4.1 GPS-Switch

When using agricultural machines, dosing errors cannot be prevented entirely when switching the machine on or off on the headlands and when driving across field edges. Overlaps and other possible consequences can cause damage to the plants, increased runoff in surface water bodies or lodge grain. These disadvantages can be prevented using a **GPS-Switch** connected to a GPS receiver.

The **GPS-Switch** enables positionally accurate switching on the headland, on the field edge or when driving around obstacles.

Boom, part width section or spreading characteristics of the respective machine are taken into account.

When driving around the field for the first time, the field borders are recorded (traced). Based on these borders, the **GPS-Switch** determines, depending on the machine parameters, the position in the field at which the device is switched on or off or whether the working width has to be changed.

A 50 hour test version has been released.

4.2 GPS track (option)

GPS track is used for track guidance on the field.

The application is integrated into the GPS switch, see page 56.

A 50 hour test version has been released.

4.3 Import VRA application maps (optional)

Fields for which the application maps are imported, are processed according to the stored set values. The set values can be edited after import.

The application is integrated into the GPS switch, see page 56.

A 50 hour test version has been released.

4.4 GPS-Switch for any agricultural implement

Even without the automatic switching of boom part width sections, the worked area on the field can be displayed and saved via manual switching on the GPS-Switch.

GPS-Track makes parallel driving easier by displaying lead tracks on the operating terminal.

4.5 Design

(1) **GPS-Switch**

(2) GPS receiver

(3) RS232 interface

(4) **AMATRON+**

(5) CAN bus

(6) Basic equipment

(7) Job computer of the field sprayer or fertiliser spreader

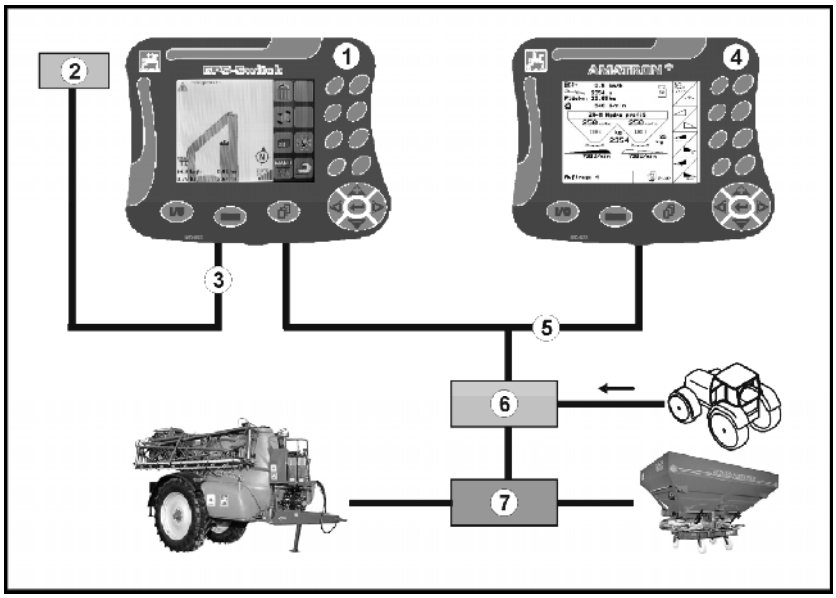


Fig. 2

4.6 Content of the GPS package

(1) Terminal for **GPS switch**

(2) Bracket for terminal

(3) USB memory stick

(4) Cable package

- Series connector cable
- Zero modem cable
- Y-cable

4.7 Software version

This operating manual is valid from software version:

GPS-Switch terminal

SW-version: 3.19
BS-version: 4.2.422

GPS-Switch

MHX 02.03.20

Have software version displayed:

AMATRON+

1. Select

.
2. Confirm

GPS-Switch

1.

4.8 USB interface

The **GPS-Switch** has a USB interface for data exchange with a USB memory stick (included in the delivery).

4.9 Main menu

The main menu is divided into 3 submenus into which the required data must be entered before beginning work (Fig. 3).

-

Lot data menu
-

Information on software and licenses
-

Settings/machine geometry menu
-

GPS-Switch menu Setup

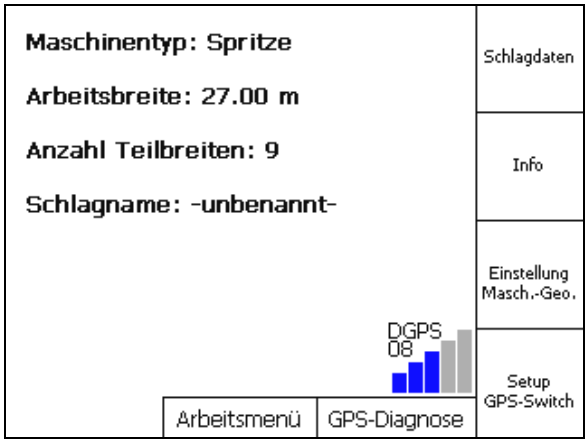


Fig. 3

4.10 Work menu

Before the work menu is visible, the machine must be created in the Settings/machine geometry menu.

Main menu ESC ⇔ work menu

During operation, the **GPS-Switch** displays the work menu.

Fig. 4, display of field border in the work menu.

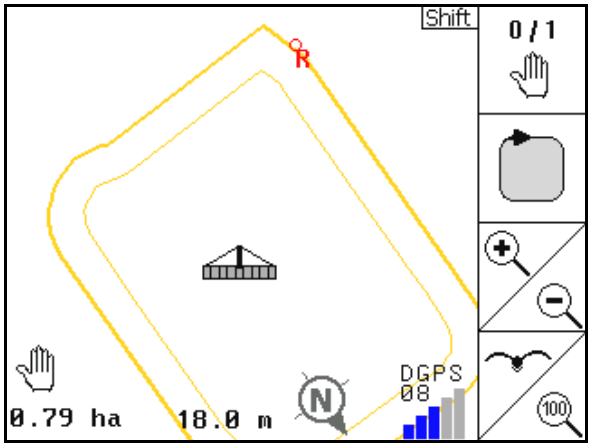


Fig. 4

Fig. 5, display of partially treated field in the work menu.

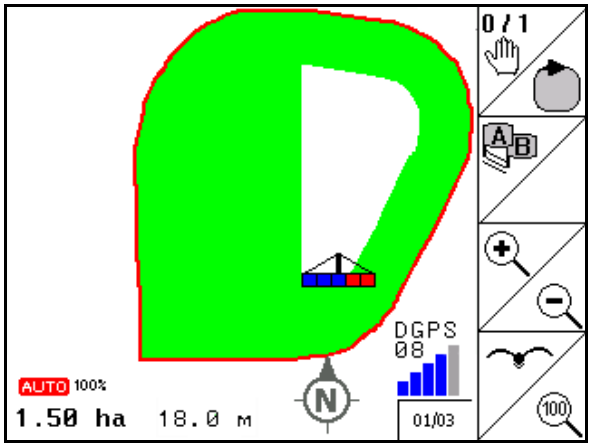


Fig. 5

Fig. 6, display of partially treated headland in the work menu.

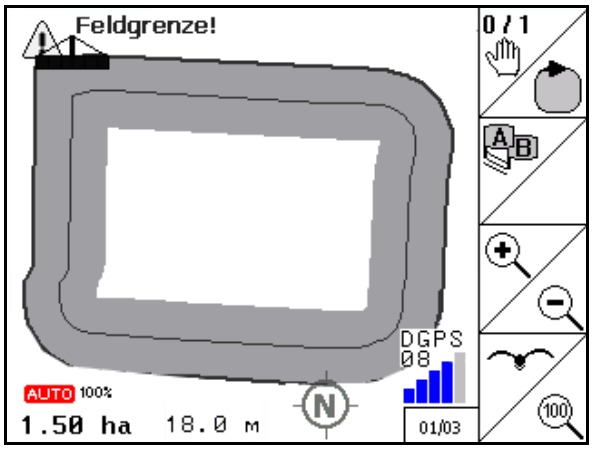


Fig. 6

Fig. 7, display of completely tilled field in the work menu.

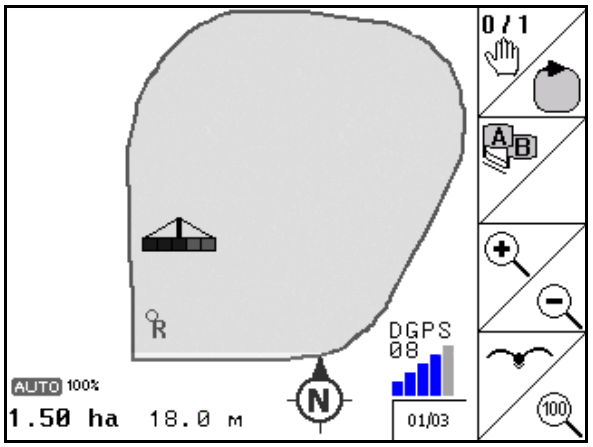


Fig. 7

Fig. 8, Display in 3D, Application maps loaded in the Work menu.

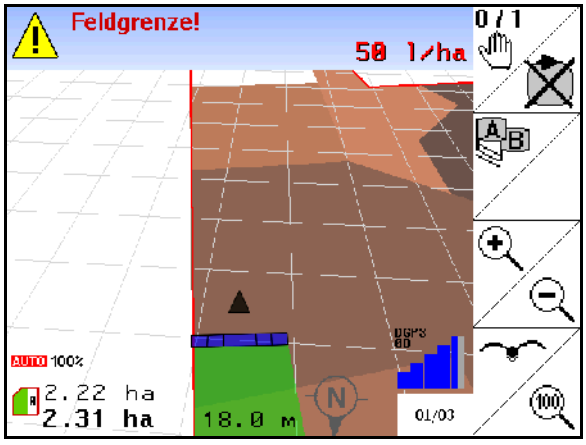
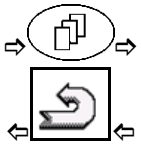


Fig. 8

4.11 GPS diagnosis menu

	Main menu		GPS- diagnosis menu

GPS data display

The GPS diagnosis shows current data about the GPS signal and the raw data for troubleshooting.

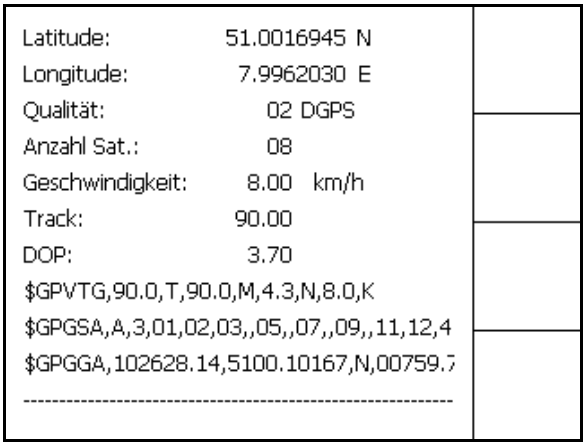
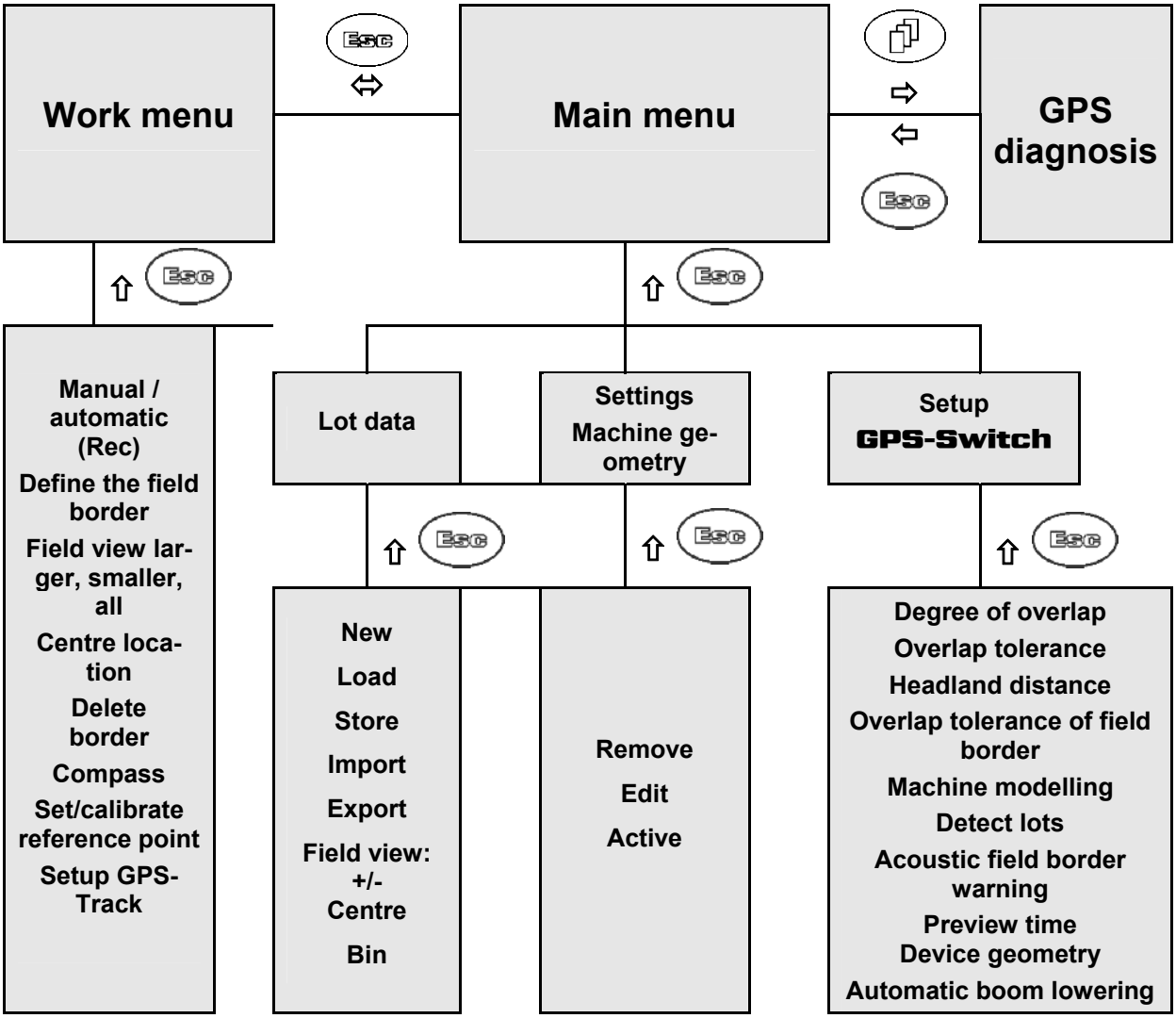


Fig. 9

4.12 Hierarchy of the GPS-Switch menu



4.13 Keys and function fields

The functions indicated at the right display edge by a function field (box or diagonally divided box) are controlled via the two rows of keys to the right of the display.

- If boxes appear on the display, only the right key (Fig. 10/1) is assigned to the function field (Fig. 10/A).
- If the boxes are diagonally divided:
  - the left key (Fig. 10/2) is assigned to the top left function field (Fig. 10/B).
  - the right key (Fig. 10/3) is assigned to the bottom right function field (Fig. 10/C).

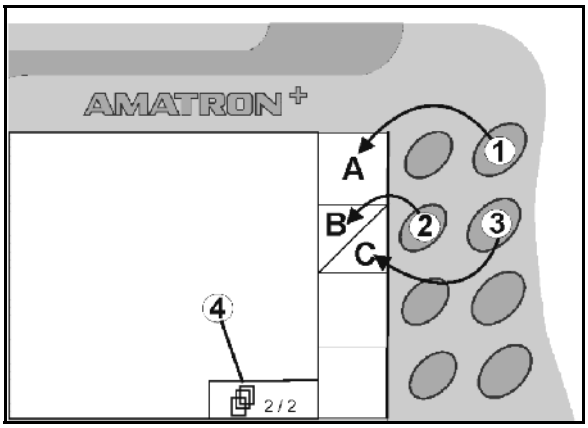


Fig. 10

I/O	On / Off (Always switch off the **AMATRON+** when driving on public roads).
Esc	• Return to last menu • Switch between work menu - main menu • Cancel entry • To work menu (press key at least 1 second)
	• Scroll to other menu pages (only possible if (Fig. 10/4) appears in display)
	• Move cursor left in display
	• Move cursor right in display
	• Take over selected numbers and letters • Confirm critical alarm • 100% quantity in work menu
	• Move cursor up in display • Increase specified quantity during work by percentage application rate increase (e.g.:+10%).
	• Move cursor down in display • Reduce specified quantity during work by percentage application rate decrease (e.g.:-10%).

4.13.1 Shift key

Active in work menu and lot data menu.

- The shift key is located on the back of the unit (Fig. 11/1).
- If the Shift key is active, this is indicated on the display (Fig. 12).
- When the Shift key is actuated, further function fields appear (Fig. 13) and the assignment of the function keys is altered accordingly.

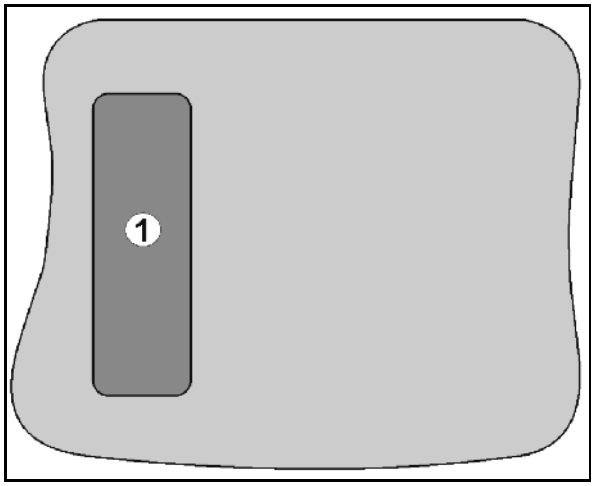


Fig. 11

Fig. 12

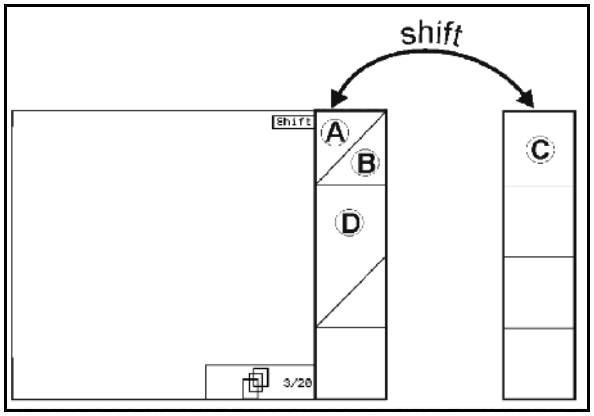


Fig. 13

4.14 Entries on the GPS-Switch

For operation of the **GPS-Switch**, the function fields appear in this operating manual in order to make clear that the key for the respective function field must be pressed.

Example:

- Function field .

Description in the operating manual:

Save the field.

Action:

The operator presses the key (Fig. 14/2) assigned to function field **A** (Fig. 14/1) in order to save the field.

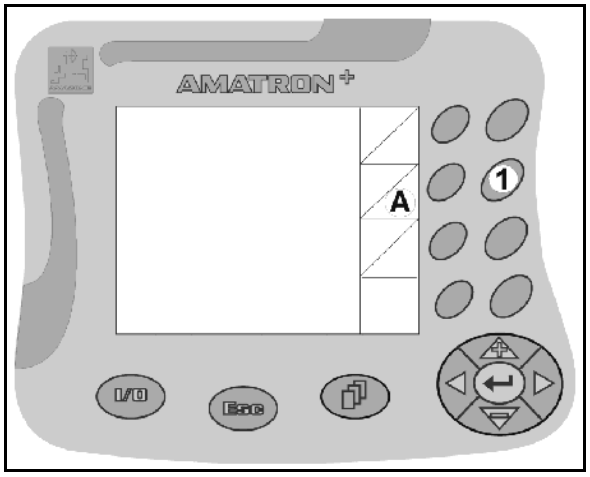


Fig. 14

4.15 Entering text and numbers

If it is necessary to enter texts or numbers on the **GPS-Switch**, the input menu (Fig. 15) appears.

In the lower part of the display, a selection field appears with letters, numbers and arrows (Fig. 15/1) which can be used to compose the input line (Fig. 15/2).

- Choose letters or numbers in the selection field.
- Confirm the selection (Fig. 15/3).
- Delete the input line.
- Alternate between capitals/small letters.
- Confirm the text entered.

The arrows and in the selection field (Fig. 15/4) make it possible to move around the line of text.

The arrow « in the selection field (Fig. 15/4) deletes the last entry.

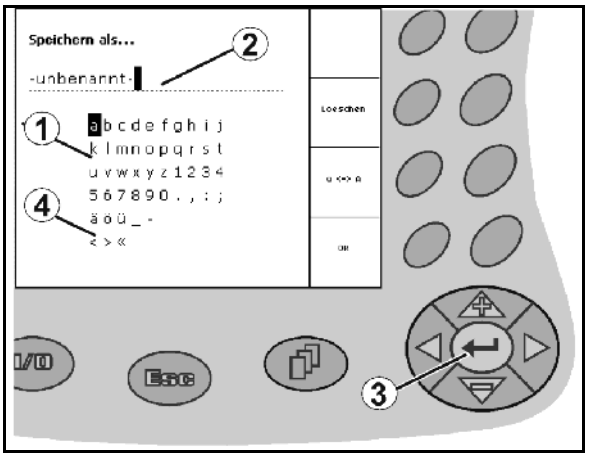


Fig. 15

4.15.1 Selection of options

1. Position selection (Fig. 16/1) using and .
2. Confirm the selection. (Fig. 16/2).

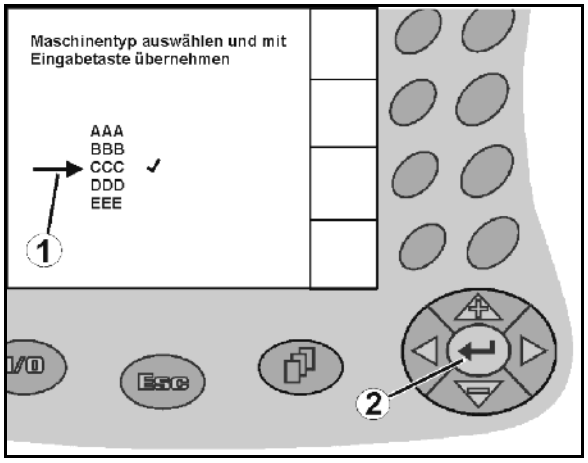


Fig. 16

4.15.2 Toggle function

Switching functions on/off:

- Press function key (Fig. 17/2) once

→ Function **on** (Fig. 17/1).

- Again press function key

→ Function **off**.

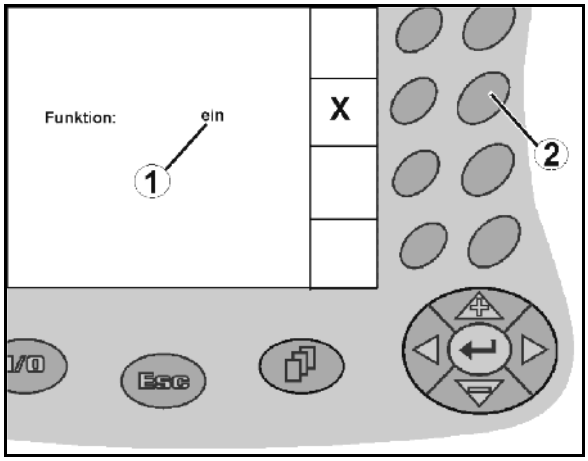


Fig. 17

4.16 Definition of the GPS parameters

GPS

Global Positioning System

DGPS

Differential GPS

Correction system increases accuracy to +/- 0.5 m to 0.02 m.

DOP

Dilution of Precision (Quality of GPS values)

4.17 Requirements for the GPS quality

GPS quality for the **GPS-Switch** depending on parameters GPS, DGPS and DOP.

		GPS quality
DGPS	DOP 0 to 6 (target state)	Good
	DOP 6 to 8	Medium
	DOP greater than 8	Poor
GPS	DOP 0 to 6	Medium
	DOP 6 to 8	Poor
	DOP greater than 8	Poor

Field sprayer:

Good quality:

- Spraying possible in automatic mode.
- Field border without safety zone

Medium quality:

- Spraying possible in automatic mode.
- Field border with safety zone of half the working width
- Worked area is shown in yellow

Poor quality:

GPS too imprecise. Field is no longer shown on the **GPS-Switch**. Thus the worked area is also not marked, which means that neither automatic mode nor creating a field border is possible.

Fertiliser spreader:

Good quality:

- Spreading possible in automatic mode.
- Field border with safety zone of half the working width

Medium quality:

- Spreading possible in automatic mode.
- Field border with safety zone of half the working width
- Worked area is shown in yellow

Poor quality:

GPS too imprecise. Field is no longer shown on the **GPS-Switch**. Thus the worked area is also not marked, which means that neither automatic mode nor creating a field border is possible.

Poor GPS or malfunctions always cause the GPS-Switch to switch over to manual mode!

Switching to manual mode always causes the machine to switch off.

5 Commissioning

5.1 Initial commissioning

- When a new GPS receiver is used for the first time, it needs a few minutes to initialise. Only then does the **GPS-Switch** receive signals.
- When it is used later, it takes approximately 30 seconds for the **GPS-Switch** to receive DGPS signals.

5.1.1 Setting the language

The **GPS switch** adopts the language of the **AMATRON+**.

Make the language settings on the **AMATRON+**..

To do so, carry out the following on the Terminal Setup menu of the **AMATRON+**:

1. Connect the **GPS-Switch** to the **AMATRON+**.
2. , It is mandatory to press a button to select the language, even if the selection arrow points to the desired language.
3. Select the desired language.
4. Confirm selection.

5.1.2 Connection to a third-party GPS system

If using a third-party GPS system instead of the **AMAZONE** GPS receiver, the following entries must be made on the GPS system:

- Serial interface must be present, Connection via 9-pin sub-D RS232 connector
  - Speed: 19200 baud
  - Data: 8 data bits
  - Parity: No parity
  - Stop bits: 1 stop bit

    (8N1)
- Compatible data records (NMEA protocol)
  - GPGGA, GPVTG(in 5 Hz), GPGSA (in 5Hz or 1 Hz) data records
- Correction signal (DGPS) must be present

5.2 Basic state

Basic state is the state that the machine is to be in after it is switched on and before functions are actuated.

After the entire system is switched on, the system is in manual mode. The machine is in the **basic state**.

Sprayer:

- Part width section valves closed
- All part width sections preselected

Spreader:

- Spreader discs off
- All part width sections preselected
- Shutter closed

5.3 Settings/machine geometry menu

→ **Select** [Einstellung Masch.-Geo.] **from the Main menu:**

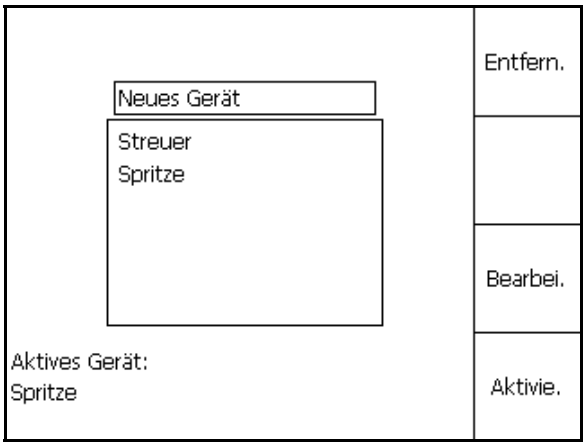


Fig. 18

- [Entfern.] Remove the selected machine from the selection list (machine must not be active).
- [Bearbei.]
  - o Create the new device and add it to the selection list.
  - o Select the machine that is present.

  (See page 25).

Select the previously entered machine or a new machine via ,

- [Aktivie.] Activate a selected machine for work using the **GPS-Switch**.

→ The active machine is shown on the display.

5.3.1 Creating a new machine

1. For new machine: Enter name.
2. Select the machine category:
   field sprayer / fertiliser spreader.
3. Enter machine data.
   - o Number of part width sections
   - o Default value for individual part width sections
   - o Dimensions for GPS x and GPS y in mm (see below)
   - o Values for the individual part width sections

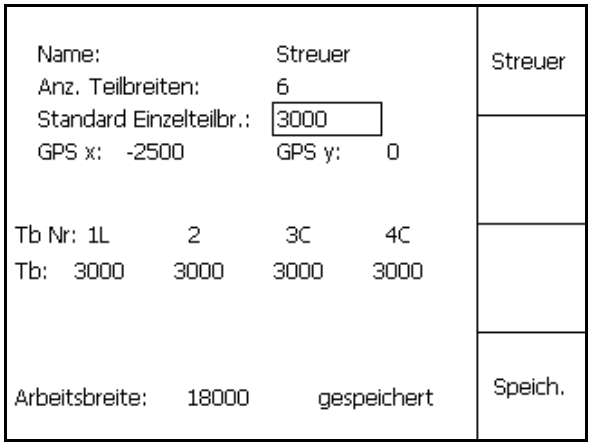


Fig. 19

GPS y (Fig. 20)

The GPS y dimension describes the distance of the GPS receiver to the centreline of the tractor perpendicular to the direction of travel.

Install the GPS receiver, preferably on the middle of the tractor cab.

If GPS receiver is installed on the tractor more to the

- right: Specify GPS y as negative value.
- left: Specify GPS y as positive value.

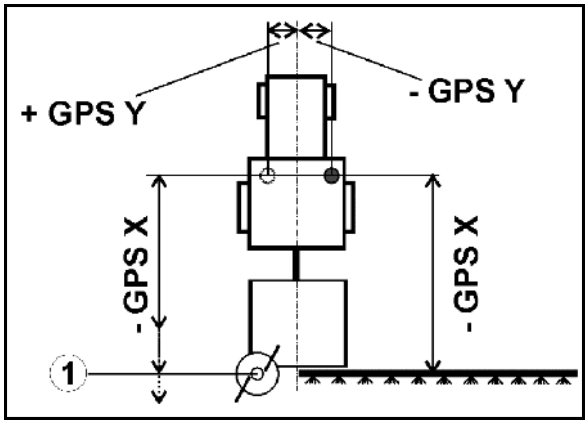


Fig. 20

GPS x (Fig. 20)

The dimension GPS x describes the distance of the GPS transmitter in the direction of travel to the switch-off point when approaching the headland:

- Field sprayer: Distance to spraying nozzles.
- Fertiliser spreader: Distance to central point of spreader discs.

(1) Switch-off point

Specify GPS x as **negative value**.

Fertiliser spreader: In order to adjust the switch-off point of the fertiliser spreader, the GPS value x can be manipulated.

Manipulating the switch-on point according to headland distance - see page 31.

1.1 Select the individual machine data

1.2 Confirm selection

1.3 Enter the value.

1.4 **O.K.** Confirm the value.

→ The working width resulting from the entered machine data is determined and displayed automatically.

2. Save the entry.

→ The save process is displayed.

3. Return to the Set machine geometry menu.

4. Activate the new machine.

→ Changes are applied.

5.4 Setup GPS switch menu

→ **Select** **from the Main menu:**

Page one **(Fig. 21-Fig. 23)**

- Enter degree of overlap - see page 29.
- , Enter overlap tolerance - see page 30.
- , Enter overlap tolerance at field border, only for field sprayer, - see page 31.
- , Distance from headland to switch-on point, only for fertiliser spreader, - see page 31.
- By means of machine modelling, the various characteristics of the different machine types are simulated.
  - o deactivated (machine with three-point attachment)
  - o Pulled machine
  - o Self-propelled machine

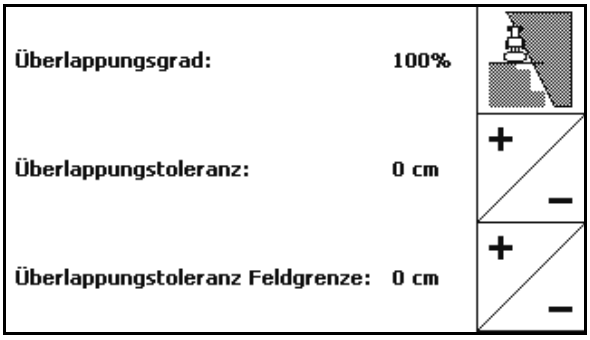


Fig. 21

Fig. 22

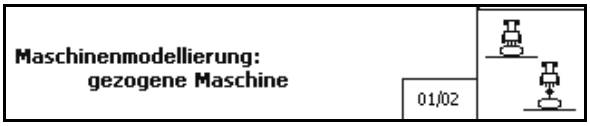


Fig. 23

Page two 02/02 (Fig. 24)

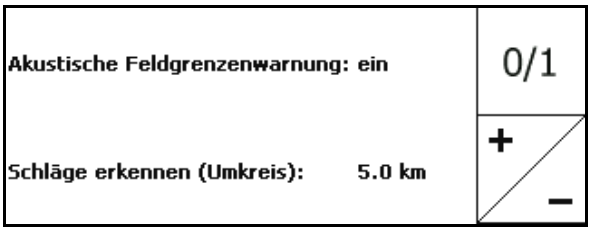


Fig. 24

- 0/1 Switching on/off the acoustic field border monitor when going beyond the field border.
- +, − Specify radius in km in which fields are displayed when loading.
- +, − Switch preview time for width sections on in advance, only for field sprayer, see page 32.
- +, − Switch preview time for width sections on with delay, only for field sprayer, see page 32.

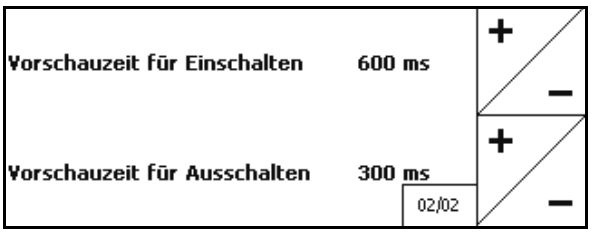


Fig. 25

Page three 02/02 (Fig. 26)

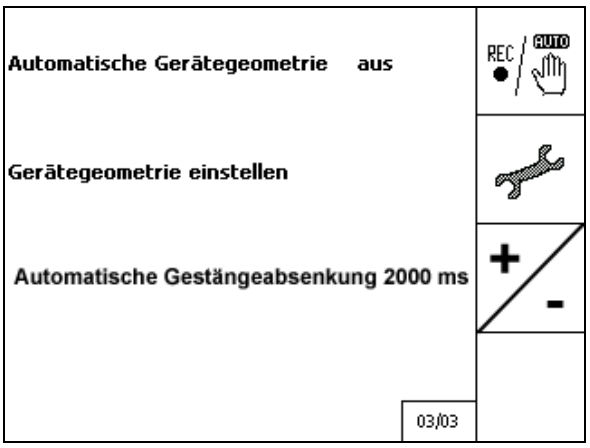


Fig. 26

- REC/AUTO Automatic device geometry

  On: For machines with automatic part width section control.

→ Add machine via device geometry settings menu.

  Off: For machines without automatic part width section control, set manual device geometry.

- Manual device geometry settings, see page 33.
- +, − Field sprayer:

  Automatic boom lowering within the field boundary.

  Enter the time in milliseconds.

  Time before switching on the sprayer in which the booms are lowered.

  Default: 0 ms

  Maximum: 5000 ms

5.4.1 Degree of overlap

When working, it is possible that areas of a part width will be covered that have already been tilled or are not supposed to be tilled.

The degree of overlap specifies whether the corresponding part width section is switched during this process.

Degree of overlap 0 % (Fig. 27):

→ As soon as there is overlap, the corresponding part width section is switched off.

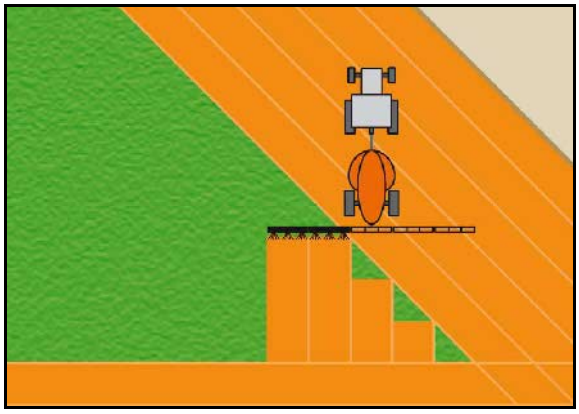


Fig. 27

Degree of overlap 50 % (Fig. 28):

→ As soon as 50 % of a part width section overlaps, the part width section is switched.

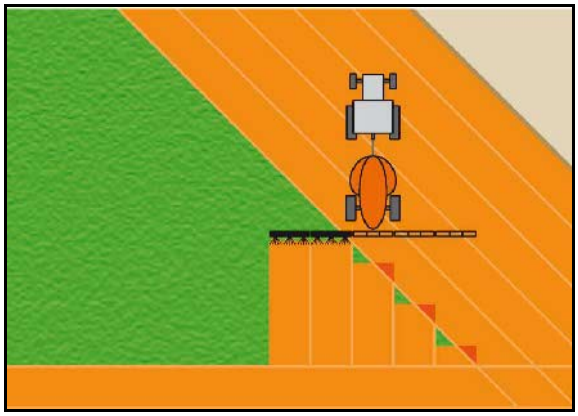


Fig. 28

Degree of overlap 100 % (Fig. 29):

→ The part width section is not switched off until there is complete overlap of a part width section.

For field sprayer only:

At the border, work is always carried out with a degree of overlap of 0%.

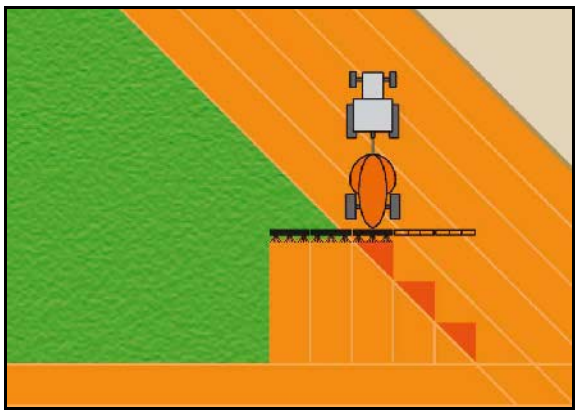


Fig. 29

5.4.2 Overlap tolerance

Specifies the insensitivity of the outer part width section and prevents constant switching of the part width sections with minimum overlap.

Setting range: 0 to 50 cm.

Example 1 (Fig. 30):

Degree of overlap: 0 %

Overlap tolerance: 50 cm

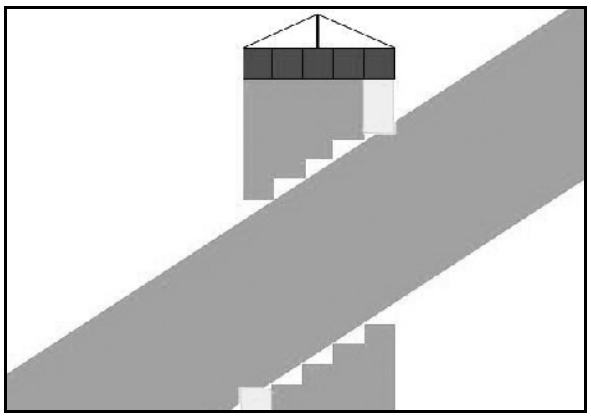


Fig. 30

Example 2 (Fig. 31):

Degree of overlap: 100 %

Overlap tolerance: 50 cm

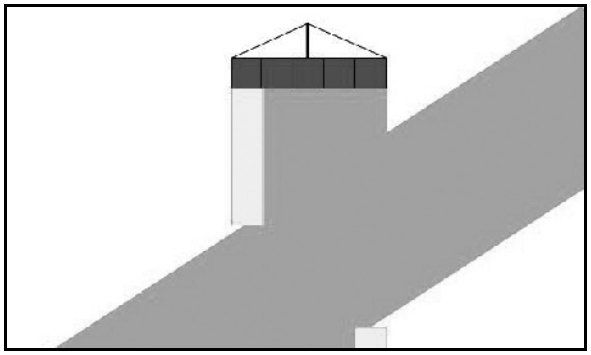


Fig. 31

5.4.3 Field sprayer: Overlap tolerance at field border

To prevent constant switching of the outer part width sections at the border, the overlap tolerance at the border can be configured separately.

Set the border overlap tolerance.

- Maximum 25 cm
- Standard / recommandation: 0 cm

At his or her own responsibility, the user can change (warning message when changing) this value to a maximum of 25 cm (one-half the distance between the nozzles).

5.4.4 Fertiliser spreader: Headland distance

Fig. 32/…

(V) The headland distance determines the switch-on point of the fertiliser spreader when driving from the tramline into the field. (Clearance between the headlands and spreading disc).

(1) Headland

(2) Field

(3) Switch-off point when driving into the headland (depending on GPS x)

(4) Switch-on point when driving into the field (depending on GPS x and V)

See page61.

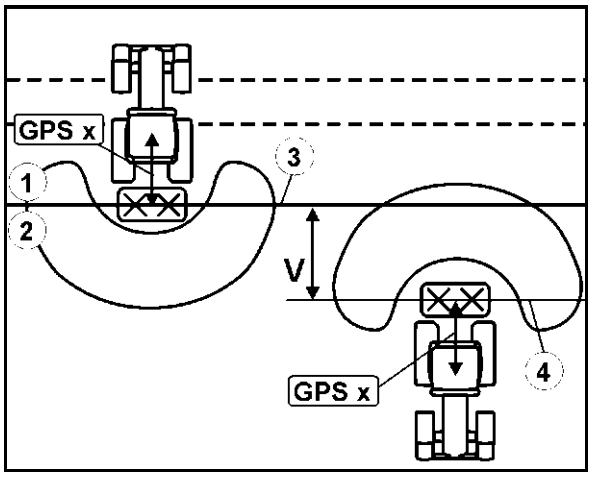


Fig. 32

The headland distance V is set as standard to half the working width.

With a working width greater than 30 m or special kinds of fertiliser, adjustment may be necessary.

In order to adjust the switch-on and switch-off points of the fertiliser spreader, the GPS value x and headland distance can be manipulated.

Set the switch-on point by entering the headland distance only when the switch-off point (GPS x) is correct.

5.4.5 Preview On / Off for field sprayer

A lead in/delay off time can be entered to ensure a smooth transition from unworked to worked areas (Fig. 33/1) of the field.

The preview is a time input in milliseconds and leads to an overlapping of the worked surfaces.

Preview time for switching on (Fig. 33/2)

When driving into an unworked area from a worked area, the boom part width sections switch on in advance by the entered lead in time.

Preview time for switching off (Fig. 33/3)

When driving into the worked area, the boom part width sections switch off later by the entered delay off time.

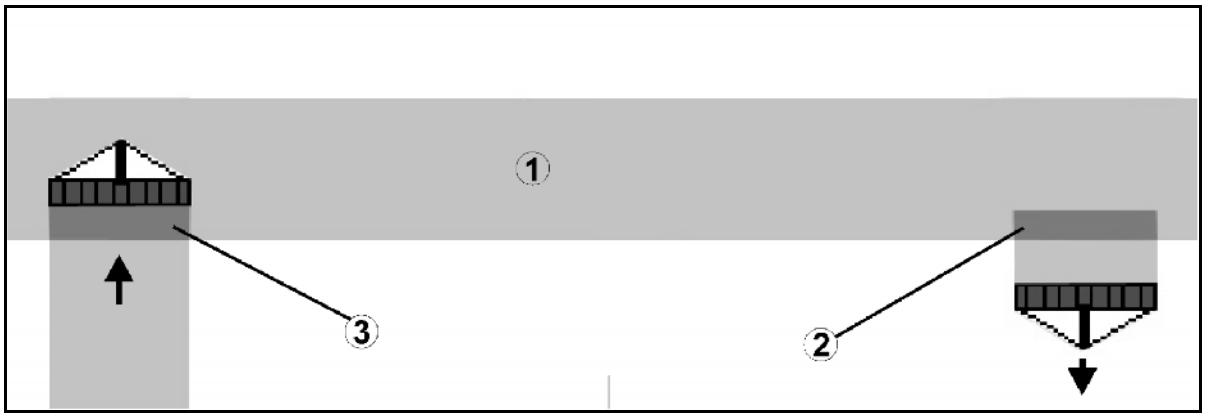


Fig. 33

- The lead in/delay off time is only used for setting a seamless working of the field.
- The size of the overlapping depends upon the travelling speed.
- Set a maximum lean in/delay off time of 1,000 ms for normal driving speeds (10 km/h ~ 2.8 m/s).
- When driving at very low speeds, a longer lead in/delay off time can be set.
- The maximum lead in/delay off time that can be set is 5,000 ms
- Longer lead in/delay off times and higher speeds may lead to undesired switching conditions.

5.4.6 Setting the device geometry

When a manual device geometry has been added, machines without automatic part width section control are able to:

- Perform parallel travel with GPS-Track.
- Record and display the worked areas on the screen via the

function in the work menu.
- Manually switch the boom part width sections according to the recommendations for the GPS-Switch.

Enter the following settings for the manual device geometry:

- GPS X, see page 25.
- GPS Y, see page 25.
- Working width
- Number of boom part width sections

Entering the settings:

1.
2.
3. Enter the values via the Input menu.
4.

Confirm the entries.

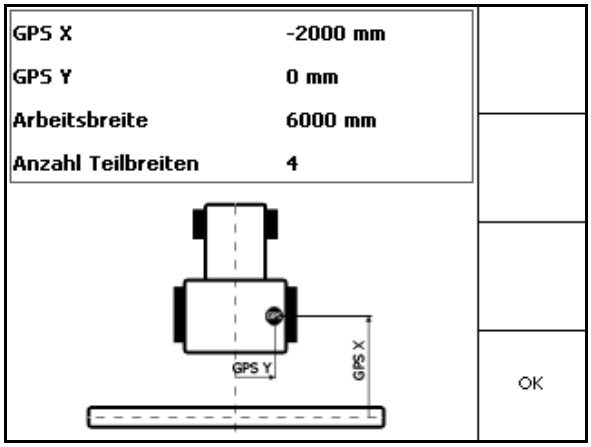


Fig. 34

5.5 Terminal Setup

Press Scroll and Shift simultaneously.

Terminal Set-up is used to change display settings.

- Setup Change display settings.

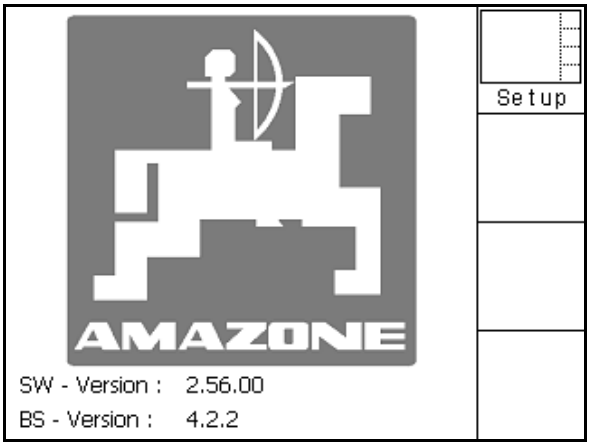


Fig. 35

- Reduce brightness on the display.
- Increase brightness on the display.

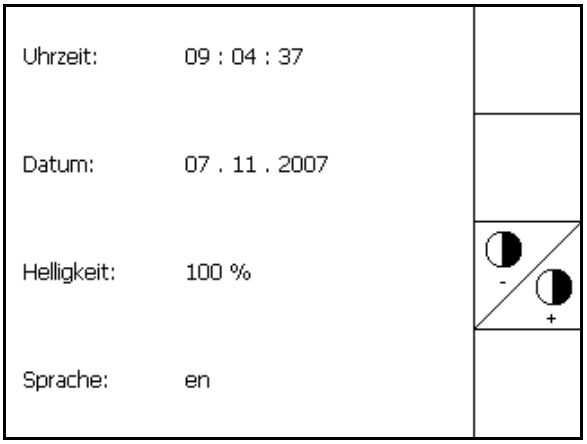


Fig. 36

5.6 Lot data menu

→ **Select** Schlagdaten **from the Main menu:**

Page 1 01/02 **(Fig. 37-)**

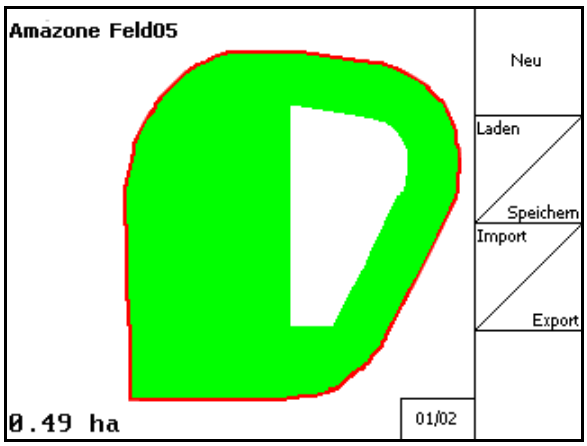


Fig. 37

- Neu New trace of a field a field.

→ White display indicates readiness for new trace a field.

Name of the field: -**unspecified-**.

When the field is saved, the name of the field is assigned.

- Laden Load field attributes from USB stick before beginning work, see page 36.
- Speichern Save a lot to a USB stick after work.

→ Enter name.

- Daten importieren Import shape files from USB stick, see page 38.
- Export Export the lot file in the shape (shp) format for use in other PC applications.

Page 2 02/02 **(Fig. 38)**

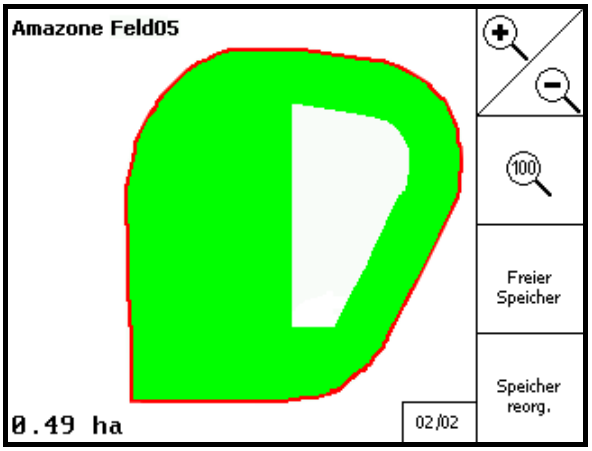


Fig. 38

- Increase field view
- Decrease field view
- Centre location
- Freier Speicher Display the available storage capacity of the USB stick.
- Speicher reorg. Optimise the memory of the USB stick if the available memory is not sufficient.

After 50 save procedures, the memory is optimised automatically.

→ Confirm message on the display.

5.6.1 Loading/deleting lot data

The following field data can be called up:

- Field border when beginning to work the field.
- Worked area (field border with worked area of the field), if work has been interrupted and is now being resumed.
- Lead track for GPS-Track
- Obstacles
- Exclusion zones
- Application maps

→ Field data which cannot be called up are shown in grey.

1. Insert the USB stick.
2. Laden Call up load submenu.
3. Ja / Nein Save the current area.

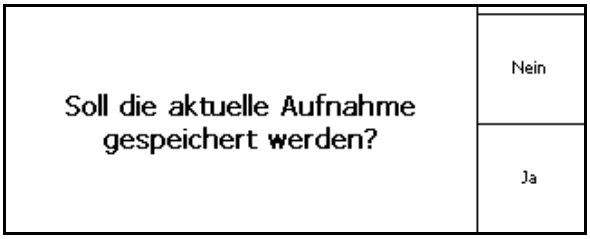


Fig. 39

4.
   - o Umkreis Only fields in the set radius are displayed - see page 28.
   - o Alle Display all fields.
   - , Select desired field

   or
   - o Suchen search for field after entering a text passage.

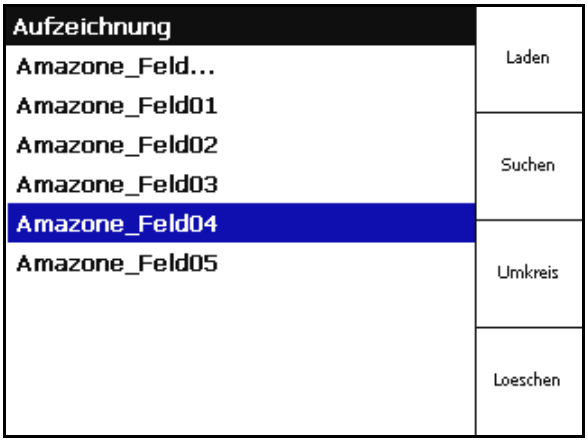


Fig. 40

5. Laden Confirm selection.

6. , Mark the desired field attributes individually.
7. Select field attribute.

→ ☑

→ Grey field attributes cannot be selected.

8. OK Load field attribute.

→ Selected field appears on the display.

9. Esc Back to main menu.

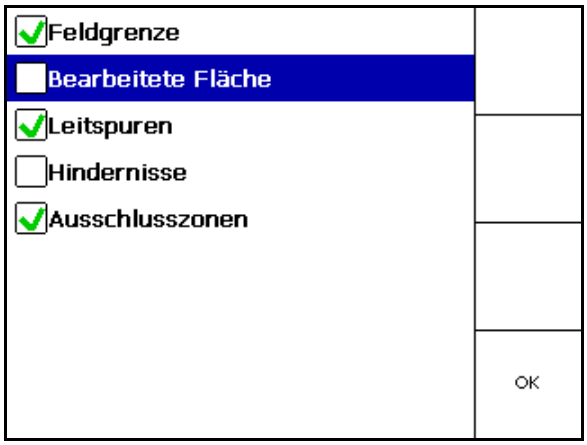


Fig. 41

- Loeschen Delete a field on the USB stick

1. , Select desired field.
2. Press Ja / Nein.

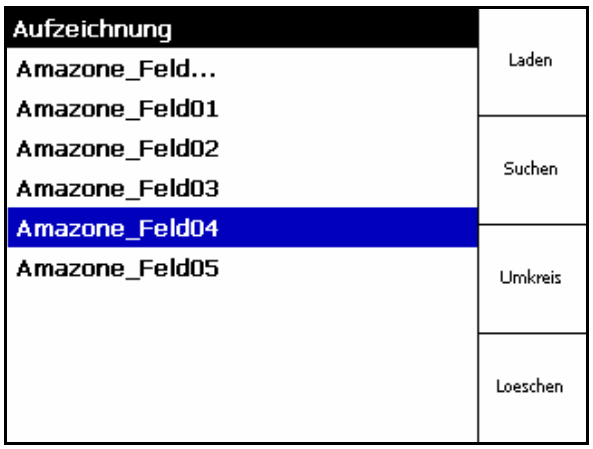


Fig. 42

5.6.2 Importing shape files

1. Insert the USB stick.
2. Import Open the Import data submenu.
3. , Select "Select desired content".
4. Import Confirm selection.

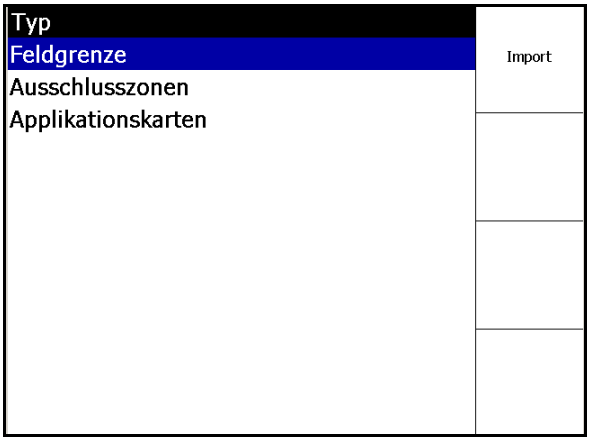


Fig. 43

5. , Select the directory where the Shape file is located.

→ Change directory

\ Highest directory level

\.. One directory level higher

\xxx Change to this directory

6. Laden Shape file was saved to the current field.

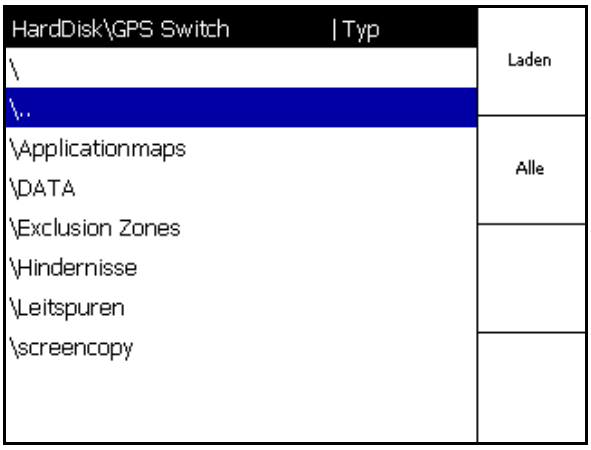


Fig. 44

Import application maps

It is recommended that application maps are stored in the **applicationmaps** folder, the system accesses this folder directly during import.

Select the following when importing the application maps:

- Spray rate
- Proportion of active substance: kg or litre of active substance/ha (specify active substance in %)

→ In the application map, the spray rate is recomputed based on the proportion of active substance.

- Rate Alle Change all spray rates of the application map to the entered value in %.
- Rate Einzeln Select individual spray rate , and change it.
- Löschen Delete application map.

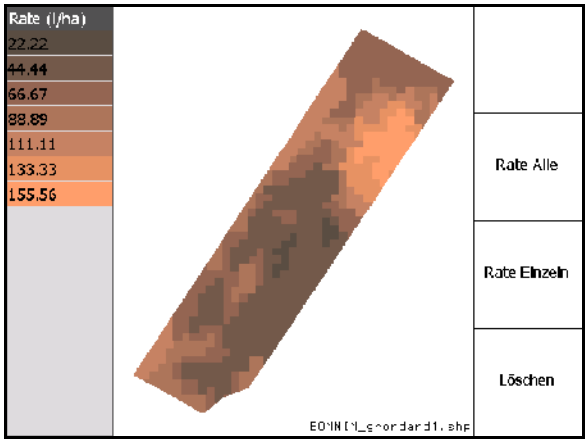


Fig. 45

6 Use on the field

Before work can begin, the following information must be entered:

- Enter lot data (see page 24).
- Set machine geometry (page 24).
- Carry out setup configuration (page 27).

Depending on the working method, it may be useful to do the following:

- Always carry out a new trace of a field (see page 50)
- After a new trace of fields or field borders, save them to the USB stick and load them before tilling the field (see page 52).

6.1 Work menu display

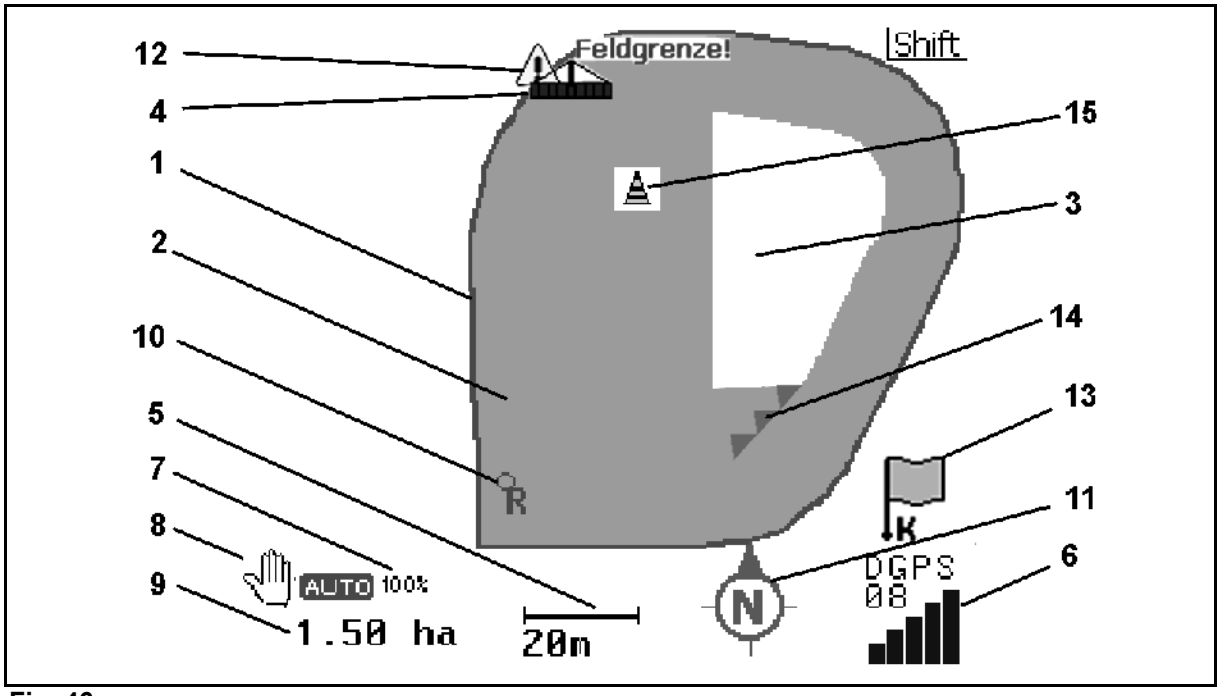


Fig. 46

(1) Field border (red)
(2) Worked area (green)
(3) Unworked area (white)
(4) Symbol for implement
(5) Working width
(6) GPS signal strength
(7) Degree of overlap
(8) Automatic mode or manual mode
(9) Total area of the lot (within the field border)
(10) Reference point, point for calibration
(11) Compass
(12) "Machine at field border" warning
(13) Prompt to calibrate
(14) up to three overlaps (only for field sprayer)
(15) Inserted obstacle

Symbol for implement with part width sections in work menu, Fig. 47.

(1) Part width sections (grey – machine not in working position)

(2) Switched-on part width sections

- blue

(3) Switched-off boom part width section

- red
- yellow (manual device geometry)

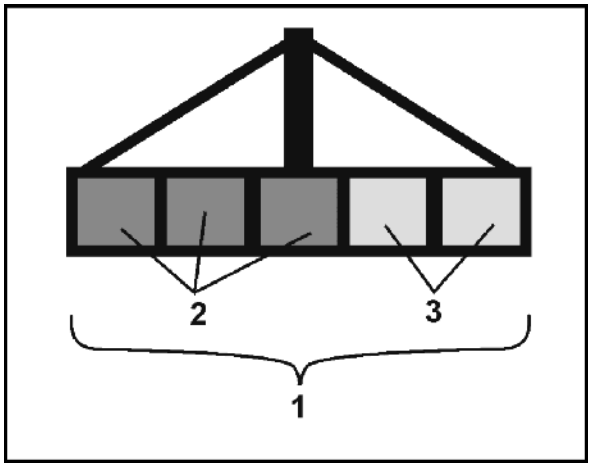


Fig. 47

6.2 Function fields in work menu

-

Changeover between manual/automatic mode.

Confirm automatic mode within five seconds.

→ Manual/automatic mode is shown in the display.

-

Exception for manual device geometry (no automatic part width section control), see page 55.

-
Define field border (immediately after driving around the field the first time for new trace of a field).

Alternative: delete field border.

-
GPS-Track: create lead track, delete lead track, see page 58.

-
Increase field view

-
Decrease field view

-
Display entire field

-

Centre location

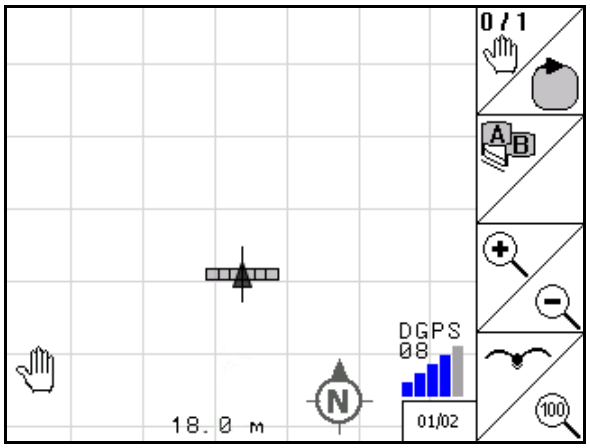


Fig. 48

Page 2 02/02

- Mark the obstacles on the field on the terminal, see page 49.
- Delete obstacle.
- Orientation of display
  - o Orientation with north towards the top
  - o Orientation with direction of travel towards the top
- Set the reference point on the field for GPS signals or select an existing reference point from the list, see page 47.

→ Before a new trace of a field.

- Calibrate the field.

→ When working an already traced field.

-

Switch to Setup menu, machine remains in automatic mode, see page 27.

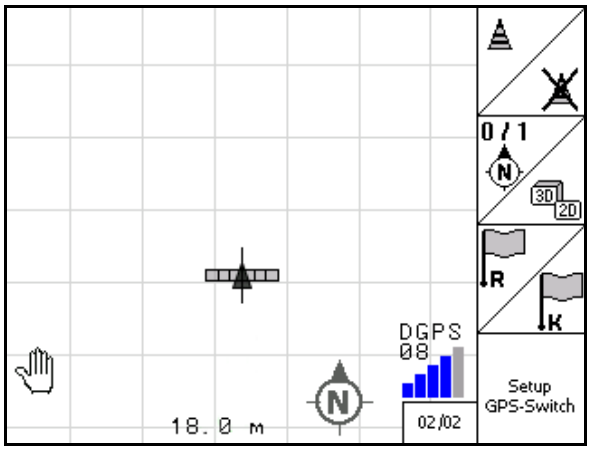


Fig. 49

6.3 Automatic mode and manual mode

The **GPS-Switch** can be used both in manual and automatic mode.

In automatic mode, switching the part width sections is automatic both in the field and in the headland.

Automatic mode:

- Automatic switching on/off and boom section control via **GPS-Switch**.

Manual mode:

- No automatic boom section control via **GPS-Switch**.
- Operation of the machine via **AMATRON+**, **Joystick**, **AMACLICK+**.
- Display and marking on the **GPS-Switch** display only.

Fertiliser spreader:

1. Switch on the spreading discs on the **AMATRON+**.
2. Automatic/manual mode

- **Automatic mode**
  -

Set **GPS-Switch** to **auto**.
  - Confirm automatic mode.
  - Shutters open and close automatically.
  - Part width sections are switched automatically via the spreader disc speed.
- **Manual mode:**
  - Shutter open and close via the **AMATRON+**.
  - Part width sections are switched automatically via the spreader disc speed on the **AMATRON+**.

3. Switch off the spreading discs on the **AMATRON+**.

Field sprayer:

1. Fold out the field sprayer and unlock the vibration lock.
2. Automatic/manual mode

- **Automatic mode**
  -

Set **GPS-Switch** to **auto**.
  - Confirm automatic mode.
  - Switch on the sprayers on the **AMATRON+**.
  - Part width sections are switched automatically.

- **Manual mode:**

  Switch on the sprayers on the **AMATRON+**.

  Switch part width sections on the **AMATRON+**.

3. Switch off the sprayers on the **AMATRON+**.

Conditions for working in automatic mode:

- Fertiliser spreader: The field border must be loaded or newly traced.
- The machine must be **prepared**:
  - o Sprayer: boom extended and swing compensation unlocked.

  → Single-sided spraying with swing compensation is possible in manual mode only.

  - o Spreader: the spreading discs must be switched on.
- The GPS signal must have sufficient quality:
  - o GPS with DOP </= 6
  - o DGPS with DOP </= 8

Switch individual boom part width sections using implement control and multi-function stick in Automatic mode

- not possible (other machines).
- possible (AMABUS field sprayer from software version 7.15).

Field sprayer:

- Switching off part width sections on the **AMACLICK** oversteers the **GPS-Switch**.

  However, the area behind the part width sections switched off in this way remains marked in green.

→ As a result, an area that is oversteered manually is switched off automatically when driving over the next time.

- Selecting individual part width sections on the **AMATRON+** is possible in automatic mode.

  In doing so, part width sections that are disengaged on the outside are also switched off at all times in the **GPS-Switch**, and this area is not marked in green.

→ This provides the ability, for example, to disable the 2 outer part width sections for a 27m sprayer at all times and thus to till a lot using 21m tramlines.

Switching off the sprayer/switching off the spreader disc drive of the fertiliser spreader on the **AMATRON+** is also possible in automatic mode.

Exiting the work menu, malfunctions or a poor GPS signal cause the **GPS-Switch** to switch to manual mode.

→ Sprayer: Close part width sections.
→ Spreader: Close shutter.

CAUTION

There is a risk of unintentional spreading of spray liquid/spreading of fertiliser when reversing in automatic mode due to automatic switching of the part width sections.

The **GPS-Switch** functions properly in the direction of travel only. Therefore, for safety reasons, switch the **GPS-Switch** to manual mode for shunting, particularly in combination with reversing.

Alternatively on the **AMATRON+**:

- Field sprayer - switch off sprayers
- Fertiliser spreader - close shutters,

6.4 The reference point

The reference point is the reference of the GPS signal to the position of the field.

The reference point:

- must be set before saving a field / or use an existing one.
- should be calibrated when requested or if a deviation from the terminal for the field has been detected.

The reference point:

- is the point on the field above which the GPS receiver on the tractor is located.
- Must be approached using the tractor and recorded with the vehicle at a standstill
- Serves to calibrate the location for the GPS signal.
- is an arbitrary point which can be found again. This point must be on or in the immediate vicinity of the field to be tilled.

  (e.g. drive until front tractor wheel makes contact with a border stone).
- Must be noted for later work cycles when saving the field.

Be careful and thorough when defining the reference point.

At each calibration, approach the reference point in the same way from the same direction.

The existence of a correction signal is recommended for setting and calibrating the reference point.

If a warning appears before an imprecise reference point do not set it!

If the position of the GPS antenna has changed after being refitted on another tractor, the reference point must be reset.

→ In this case, calibration is not sufficient.

6.4.1 Incorrect calibration

Incorrectly calibrated data cannot be used.

Should you have inadvertently carried out a calibration at a wrong location, it is possible to drive to the correct location and repeat the calibration.

6.4.2 Assign new reference point

The following procedure is needed to set a new reference point:

1. Loading the field
2. Calibrating the field

→ Now you can set a new reference point or select one from the list

6.4.3 Using RTK-GPS

This procedure presupposes use of an RTK station.

A reference point should also be set when using an RTK station as this makes a calibration of the field possible when the RTK signal fails.

- Processing the GPS data when setting or calibrating the reference point takes approximately 15 seconds (30 seconds without an correction signal) and is indicated on the display.
- Confirm the reference point.

Fig. 50

6.5 Marking of obstacles

Obstacles on the field can be marked on the terminal

1. Insert obstacle.
2. Displace obstacle.

→ The position of the obstacle in relation to the GPS antenna is displayed.

3. Confirm position
4. Delete the obstacles within a circumference of 30 metres.

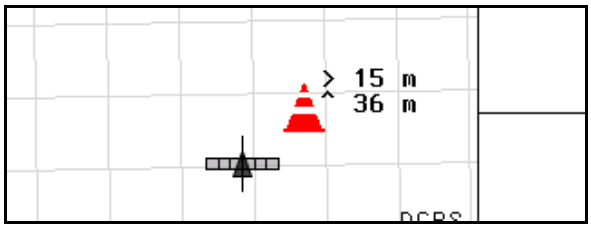


Fig. 51

Before reaching the obstacles, an acoustic and visual warning is released.

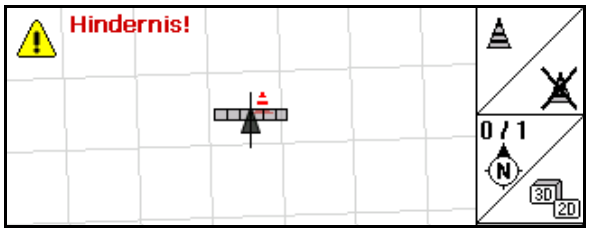


Fig. 52

6.6 Procedure for new trace of the field

If the headland is usually treated at the beginning of the field-work:

→ Always carry out a new trace of the field.

→ Carry out the first drive around the field in manual mode.

→ Field sprayer: The first drive around the field can also be carried out in Automatic mode.

For this purpose, switch the spraying on and off manually also in Automatic mode when manoeuvring and reversing.

Fig. 53, before new trace: Display without field/field border.

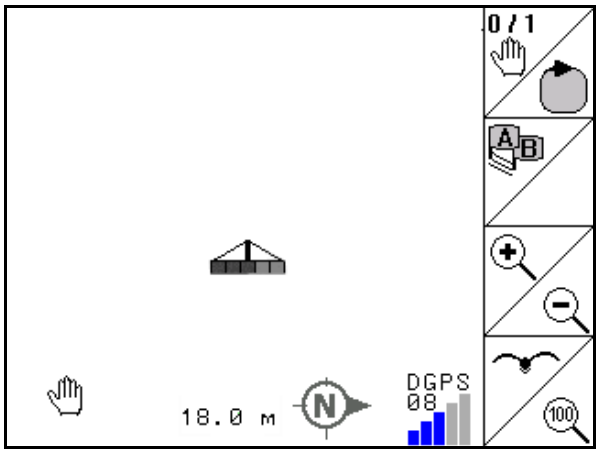


Fig. 53

1. I/O Switch on the **AMATRON+**, the **GPS-Switch** switches on automatically.

→ After approximately 30 seconds, the **GPS-Switch** receives DGPS signals.

2. Schlagdaten Select the Lot data menu.

3. Neu New trace of a field.

→ Field **-unspecified-** created.

4. Esc Back to main menu.

5. Esc Select the work menu.

6. Set / load the reference point when wishing to save the field / field boundary.

   o R drive to the reference point and set, or

   o R select the reference point from the list.

- The reference point must be set / loaded if the newly traced field is to be saved.
- The reference point should be set / loaded if the fields are large fields with correspondingly long working time, as only this way is it possible to calibrate the field.

→ This makes it possible to avoid inaccuracies due to satellite drift.

7. Drive around the field for the first time with the machine in use in manual mode (Field sprayer: also possible in Automatic); see page 44.
8. On **AMATRON+**: Switch on machine.

→ Work on the field border.

9. On **AMATRON+**: Switch off machine.
10. Determine the field border.

→ The field border is displayed.

11. Set the **GPS-Switch** to **auto**.
12. Confirm automatic mode.
13. On **AMATRON+**: Switch on machine.
14. Till the inside of the field.

→ The part width sections are switched automatically.

→ After the entire field has been covered, all part width sections are disengaged automatically.

After use:

1. On **AMATRON+**: Switch off machine.

2. **If necessary:** Save lot data to USB stick (see page 36).
3. Switch off the **AMATRON+**, the **GPS-Switch** is switched off automatically.

6.7 Procedure for loading a field border / a field

→ Driving around the field is possible in automatic mode.

For this purpose, switch the spraying on and off manually also in Automatic mode when manoeuvring and reversing.

Fig. 54, stored/loaded field border

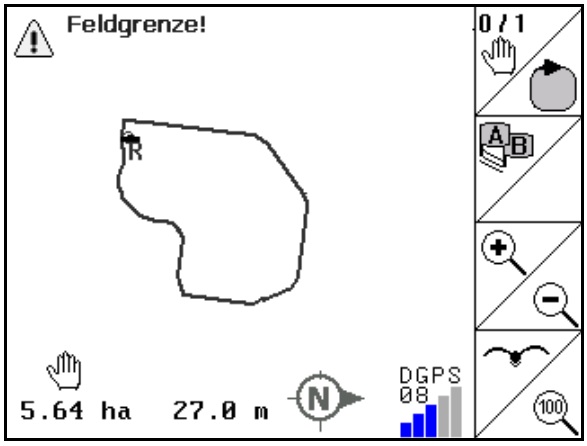


Fig. 54

1. I/O Switch on the **AMATRON+**, the **GPS-Switch** switches on automatically.

→ After approximately 30 seconds, the **GPS-Switch** receives DGPS signals.

2. Load field border / field via Lot data menu (see page 36).
3. ESC Back to main menu.
4. ESC Select the work menu.
5. Drive to the reference point.
6. Calibrate the field and remain in place for 15 seconds.
7. 0/1 Set the **GPS-Switch** to **auto**, see page 44.
8. Confirm automatic mode.
9. On **AMATRON+**: Switch on machine.

→ Work the field in automatic mode.

After use:

1. **When interrupting work:** Save lot data to USB stick (see page 36).
2. On **AMATRON+**: Switch off machine.
3. ⏻ Switch off the **AMATRON+**, the **GPS-Switch** is switched off automatically.

6.8 Interrupting the work

If the fieldwork is interrupted and the on-board computer is switched off:

- The reference point should be set.
- After the on-board computer is switched on again, the tilling status of the field appears in the working display and work can resume.
- Saving the field to a USB stick is necessary if tilling another field after the interruption and before resuming work.

Fig. 55, field loaded after interrupting the work.

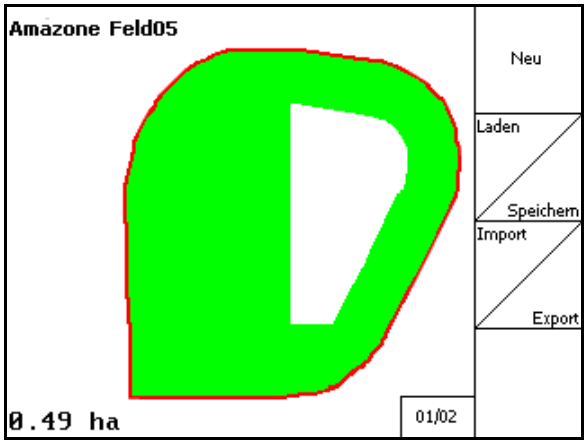


Fig. 55

6.9 During the work

If a reference point has been set.

Carry out a new calibration as soon as possible if the last calibration was four hours ago and the **GPS-Switch** prompts you to do so.

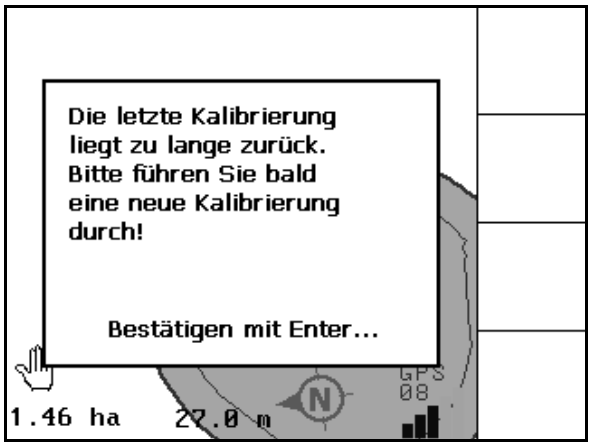


Fig. 56

6.10 Safety zone

When creating a field border, a safety zone is generated. This zone lies within the field border and is indicated by a thin line (Fig. 57).

Working in automatic mode is not possible in the safety zone.

Width of the safety zone for fertiliser spreaders:

- Half working width (AB).

Width of the safety zone for field sprayer:

- Default: 0 m (no safety zone).
- For poor GPS signal: Half the working width (AB).

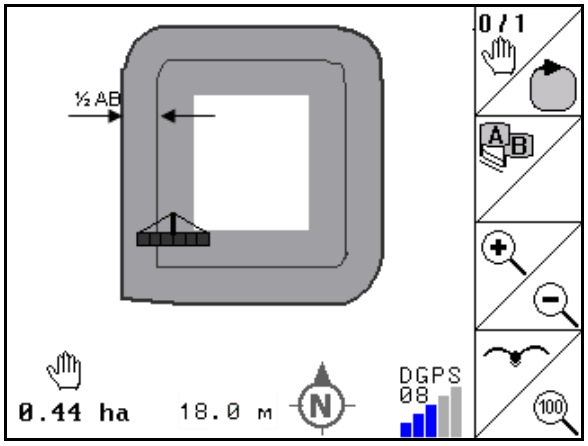


Fig. 57

Automatic mode: Individual part width sections that are in the safety zone are switched off.

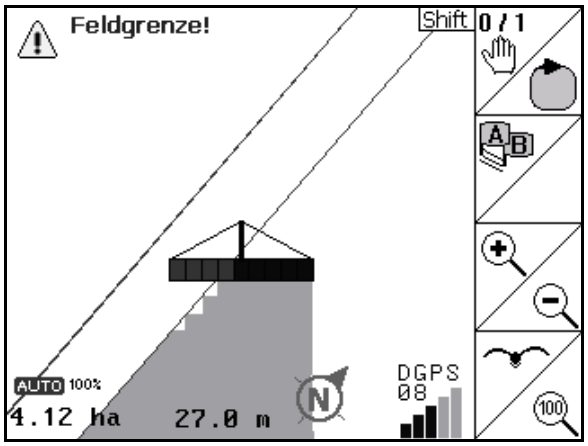


Fig. 58

6.11 REC for manual device geometry

For machines without automatic part width section control

1. Switch on the boom part width sections manually on the machine.

and simultaneously

2. REC Begin with the recording of the worked field.
3. Every time boom part width sections are switched off with REC, interrupt the recording at the same time.

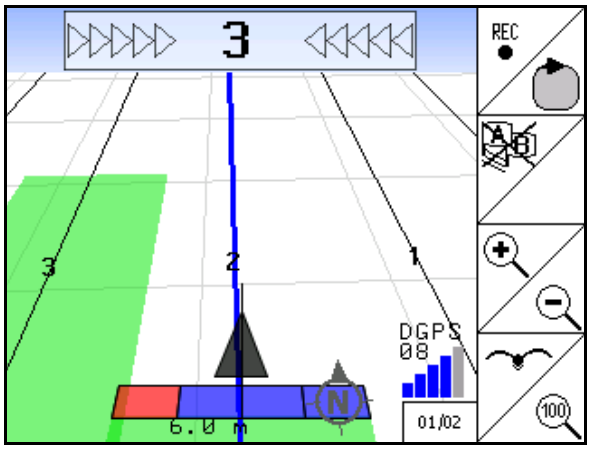


Fig. 59

Once the field borders have been recorded by driving around the perimeter, the field borders can be created and saved in the terminal, and used for machines with automatic part width section control.

7 GPS track application

7.1 Function

GPS track is an application for track guidance on the field. Parallel to the first lead track, other lead tracks are laid.
The lead tracks are shown on the terminal.
The light bar shows the deviation of the tractor from the lead track and thereby enables an exact travelling along the lead tracks.

7.2 GPS Track im Arbeitsmenü

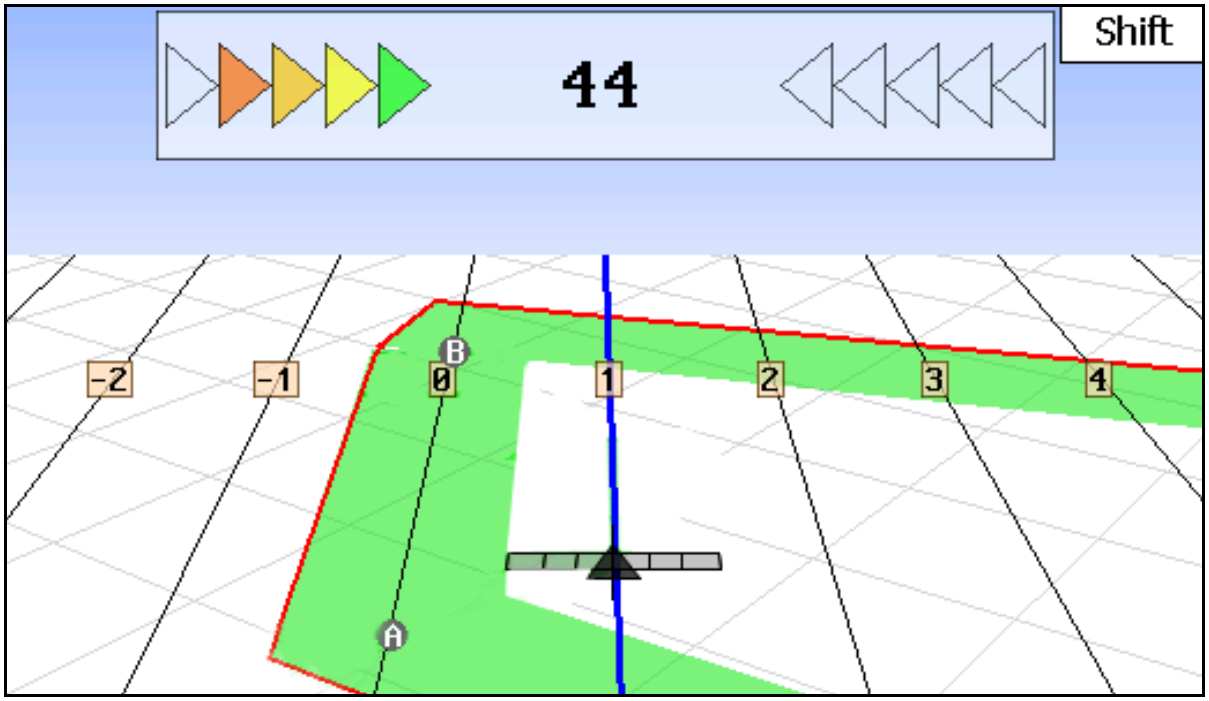


Fig. 60

(1) Numbered lead tracks
(2) Active lead track (blue)
(3) Following lead track
(4) Light bar for finding the lead track
(5) Distance from the lead track in cm
(A) Starting point for creating the lead tracks
(B) Terminal point for creating the lead tracks

7.3 Use of the GPS track

1. Setup GPS switch:
   - o Select guide pattern, see page **59**.
   - o Enter beds, see page 60.
   - o Enter lead track spacing, see page 59.
2. Make lead tracks during the first run on the guideline, see page 58.

→ The lead tracks made are displayed in the selected guide pattern.

3. Search for the next numbered lead track.

→ When the lead track is reached, it is marked in blue.

4. Drive down the lead track.

→ Observe the light bar in the process.

5. When travelling the first time, register the obstacles present, see page 49.

7.4 Creating lead tracks

7.4.1 Lead tracks via AB guide pattern or identical

Before creating lead tracks, the following steps have to be carried out in the Setup menu, see page 59:

- Select guide pattern
- Drive on beds
- Lead track spacing

1. Establish starting point A to create the lead tracks.
2. Make the run to create the lead tracks.
3. Establish stopping point B to create the lead tracks.

→ The lead tracks are calculated and displayed on the terminal.

4. Delete the lead tracks.

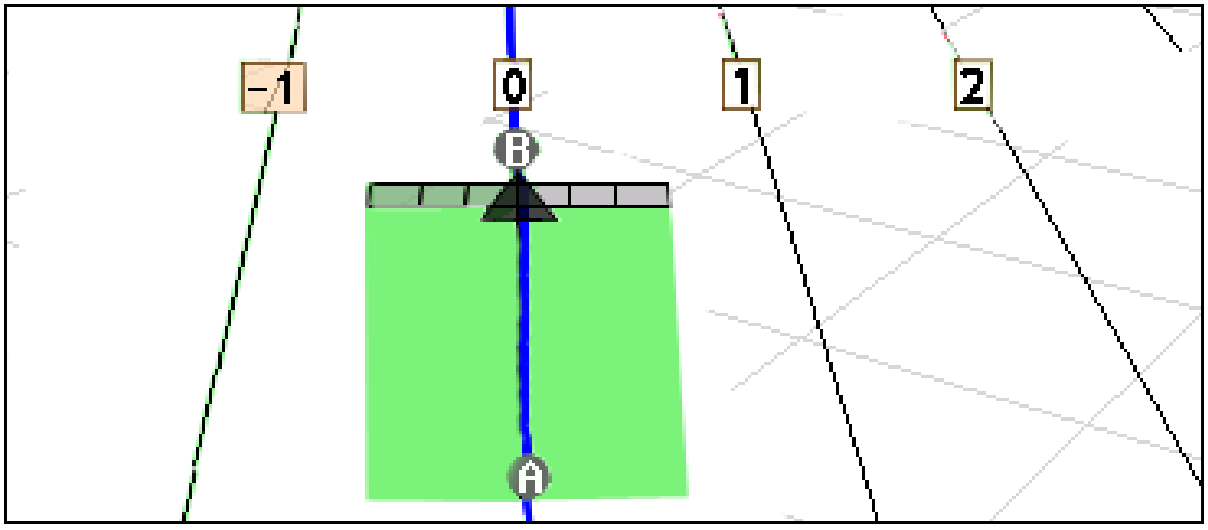


Fig. 61

7.4.2 Lead tracks via A+ guide pattern

1. Establish starting point A to create the lead tracks.
2. Enter the angle for the course of the lead tracks.

→ The lead tracks are calculated and displayed on the terminal.

7.5 Setup (GPS track)

In the Work menu: +

.

(Fig. 62)

- o Straight connection line guide pattern or any contour between points A and B.
- o , Beds.
- o Lead track spacing
  The working width of the implement as standard. To ensure an overlapping, the value can be somewhat reduced.
- o , Set the sensitivity of the light bar in cm.

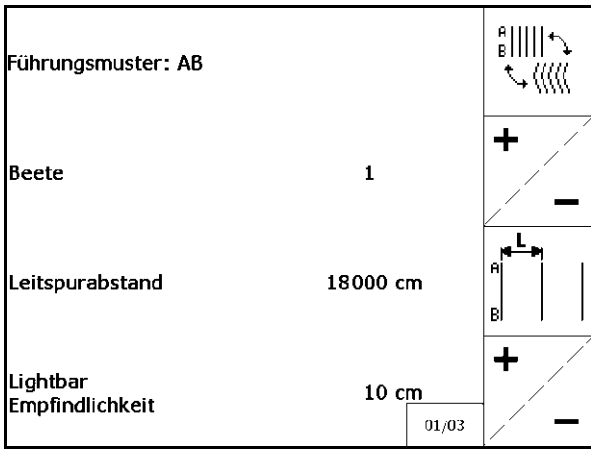
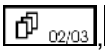
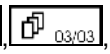


Fig. 62

→  ,  , see page 27.

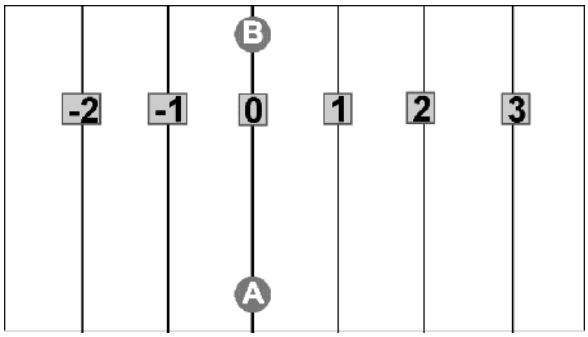
7.5.1 Guide pattern

GPS track makes possible the creation of various guide patterns.

Parallel travel

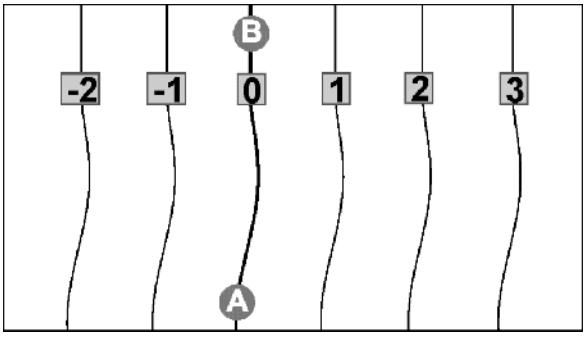
The lead tracks are parallel lines:

- AB → The lead tracks are straight, parallel lines to connect the set points A and B.
- A+ → The lead tracks are straight, parallel lines established by points A and B. and an angle in which the lead tracks should run.

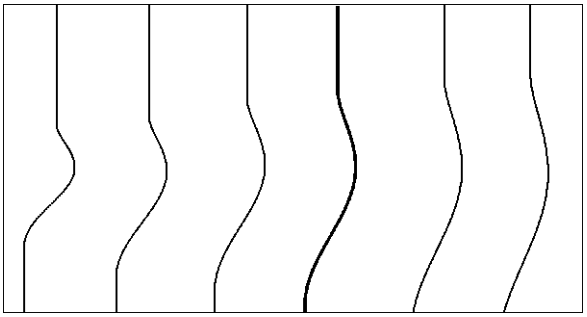


Contour travel

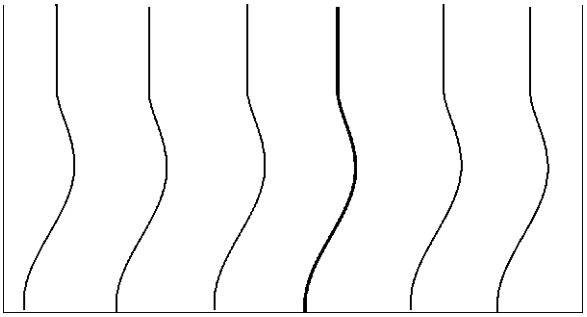
The lead tracks are random contours.



- Smoothed contour → The lead tracks contain curves where the radius of the first lead track is adjusted accordingly. Next to the inner curve, the radius gets smaller; next to the outer curve, the radius gets larger.



- Identical contour → The lead tracks contain curves where all lead tracks correspond with the first lead track.



7.5.2 Travel beds

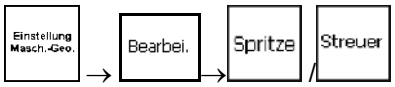
When travelling the beds, one lead track is not travelled after the other, but one or more lead tracks are left out and worked later.

Thus, the adjacent lead track can be avoided when manoeuvring.

The lead track interval is to be entered.

8 Fault

The **GPS switch** switches	
• off too early in direction of travel	→ Increase GPS value x
• off too late in direction of travel	→ Reduce GPS value x
• on too early in direction of travel	→ Increase headland distance V
• on too late in direction of travel	→ Reduce headland distance V
Example:	
Problem:	Solution:
Fertiliser spreader switches off 5m too early, current GPS value x -3000.	GPS value x: increase to -8000. → Fertiliser spreader switches off correctly, but now switches on too late. Solution: Reduce headland distance V by 5000.
• transverse to direction of travel, incorrectly	→ GPS y-value incorrect → incorrect prefix
Strips forming between the tracks	→ Tramlines incorrect → GPS drift, calibrate reference point.
No reception:	
Call up GPS diagnosis menu.	
Data available ? No	• Check connections of antenna / external GPS. • Lamp on antenna lights up? (Red: Power, Orange: GPS, Green: DGPS) • Check external GPS unit. Settings 19200 baud, 8 data bits, Parity: none, 1 stop bit
Data available ? Yes ->	• Check external unit NMEA data records. GGA, VTG, GSA, 5Hz • Check GPS quality. Is the GPS signal too poor? See list of signal requirements.
GPS switch and/or Amatron+ cannot be switched on	
GPS switch switched on and off too fast.	• Wait a few seconds and switch on again. • Pull out 9-pin connector of basic equipment and reconnect.
The GPS switch does not switch correctly (mostly too late).	• Check external GPS. Are GGA, VTG and GSA transmitted with 5Hz?

Spreaders/sprayers - Symbol does not move during travel, but is shown and responds to switching on and off (blue/red/grey).	• Check external GPS. Are GGA, VTG and GSA transmitted with 5Hz?
Fault message: Creation of a field border not possible. → Field border already exists. It was forgotten to create a new lot. The lot can be made visible via the bird's perspective.	• Create a new lot, go round again (if necessary without spraying/spreading), then determine field border.
The GPS switch does not respond to the machine.	• Is the right machine set in the **GPS switch**? →  • Has the machine got the right software? → Spreader: from version 2.31 → Sprayer: from version 7.06.01/02m • Is the Y-cable correctly connected or defective?
One or more part width sections in the Amatron+ do not respond to the GPS switch, **or vice versa**.	• Check whether the number of part width sections in the **GPS switch** corresponds to those in the **Amatron+**.
Individual part width sections switch too early or too late	• Check whether the width of the individual part width sections in the **GPS switch** corresponds to those in the job computer.
The field border is displaced after loading.	• Calibrate the reference point. Is the field border still displaced? • Reference point not found / driven to exactly.
GPS switch does not respond, or responds incorrectly.	• Pull out 9-pin connector of basic equipment and reconnect. • Switch on the **GPS switch** • Create a new field! • Do not store the old field!

If the **GPS-Switch** does not receive a GPS signal, this is indicated in the display (Fig. 63).

→ The **GPS-Switch** switches from automatic to manual mode.

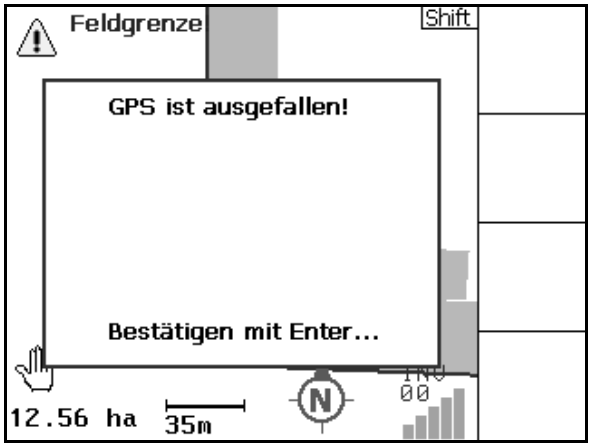


Fig. 63

If the **GPS-Switch** identifies a signal as an outlier, this is indicated in the display (Fig. 64).

→ The **GPS-Switch** switches from automatic to manual mode.

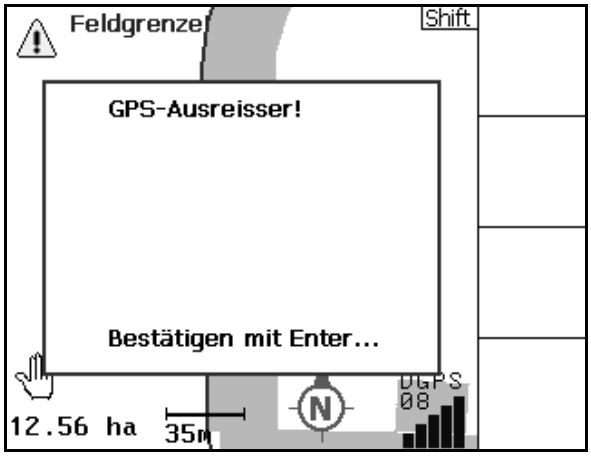


Fig. 64

A switch to automatic mode is possible only with defined field border.

→ Define the field border in manual mode.

Or:

→ Load field border.

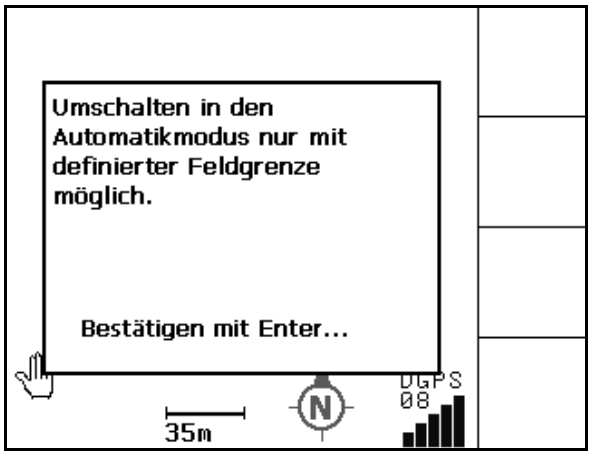


Fig. 65

Poor GPS signal while driving around the field for the first time:

- The area in which work was carried out with a poor GPS signal is marked in yellow.

→ The safety zone is increased.

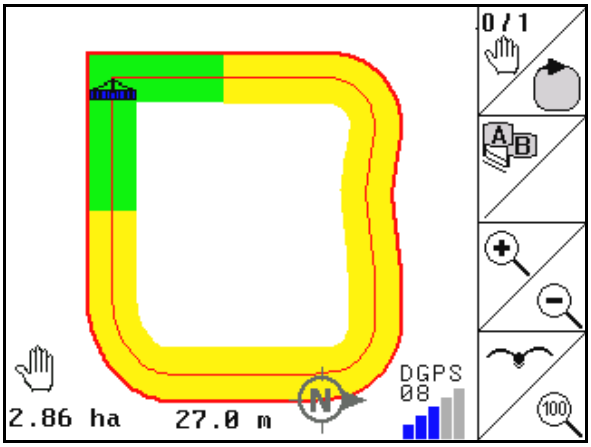


Fig. 66

No GPS signal present.

→ Display of the field is not possible.

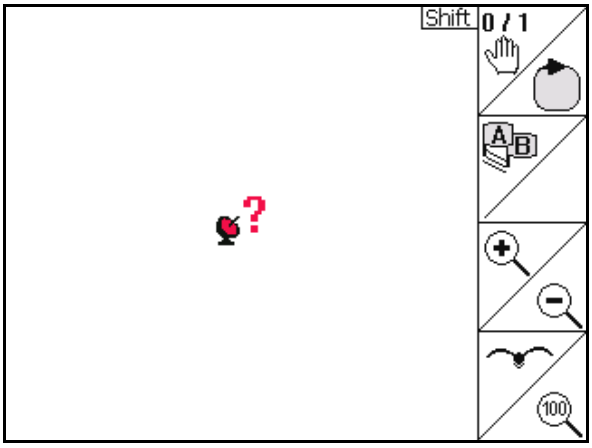


Fig. 67

Machine not prepared:

- Spreader disc drive not switched on?
- Sprayer boom not unlocked?

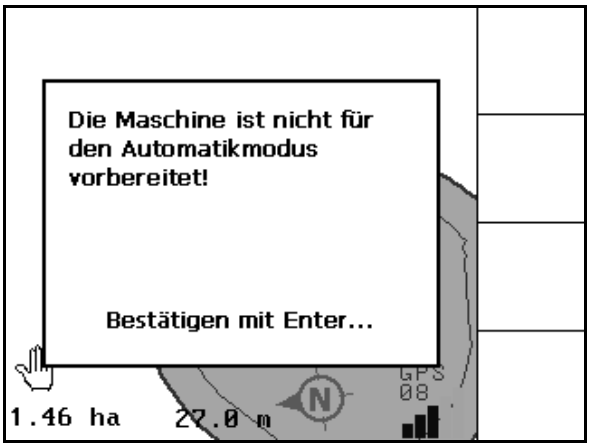


Fig. 68

9 Maintenance

9.1 USB stick data management

Fig. 69

The USB stick contains two folders for storing the data:

- Data

  Three files with all stored fields and field borders.

→ "Data" folder for storage on computer, if memory of the USB stick is full.

- **GPS-Switch**Export

  Shape data for GIS program.

9.2 Selecting EGNOS satellites

This configuration menu is suitable only for the Receiver Hemisphere Crescent A100 offered by **AMAZONE**.

Three EGNOS satellites are available for signal correction. Of these, two satellites must be selected (standard SAT1 120, SAT2 124 / optional SAT 126).

In event of failure of one satellite (120,124) it can possibly be replaced by satellite 126.

-

Menu for selecting the EGNOS satellites.

-

Check the configuration of the selected satellites.

→ Display OK

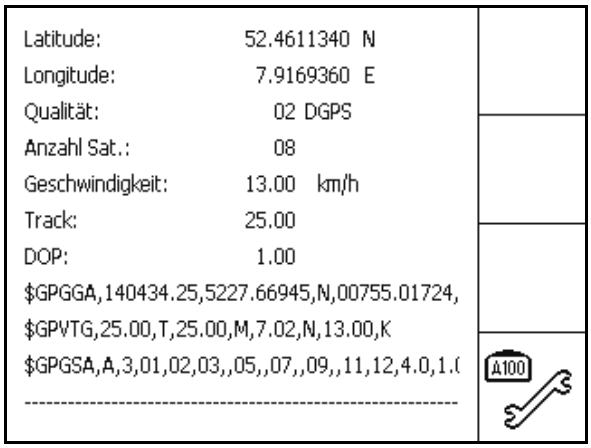


Fig. 70

1.

Select first satellite.

2.

Select second satellite.

3.

Configure selected satellites.

→ Display OK

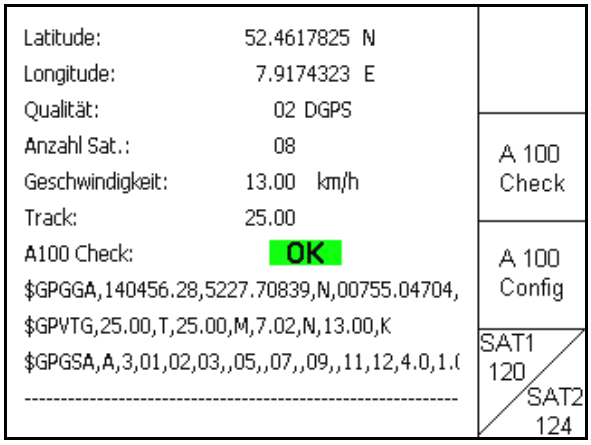


Fig. 71

9.3 Carrying out a software update

1. Switch on the **GPS-Switch**.
2. Select Settings/machine geometry.

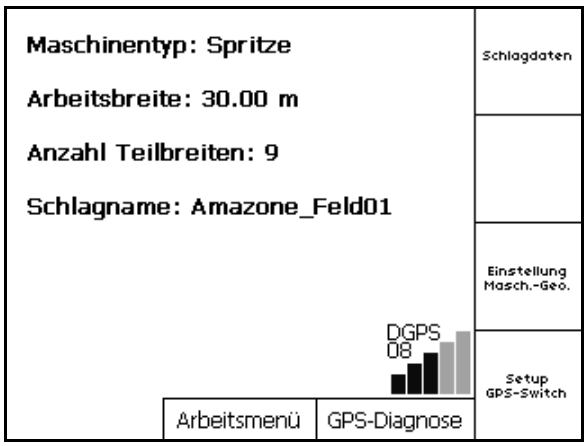


Fig. 72

3. Make a note of the entered machines in the list.
4. Call up settings for the individual machines.

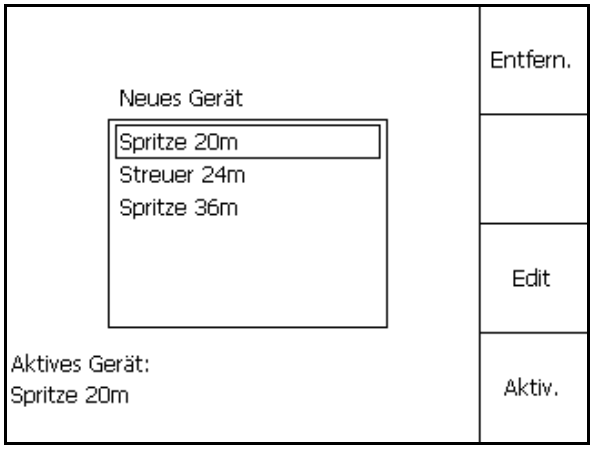


Fig. 73

5. Make a note of the settings of each individual machine. The most important are these:
   - Number of part width sections
   - Default assignment of individual part width section
   - GPS x
   - GPS y
   - Tb

- Note that only the first 4 part width sections are shown on the display.
- Locate other part width sections.

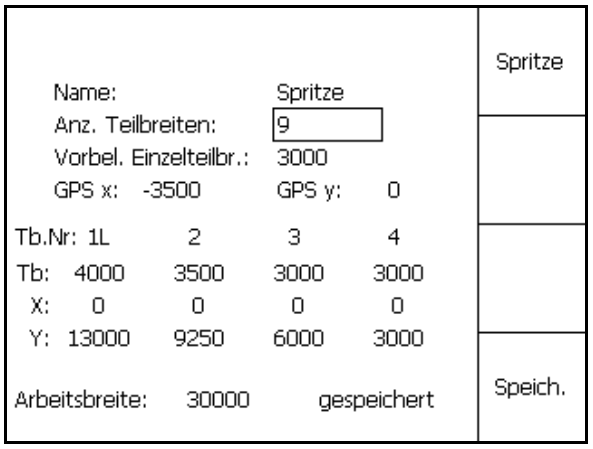


Fig. 74

6. Esc Back to main menu.
7. Setup GPS-Switch Call up the Setup menu.
8. Make a note of the settings.

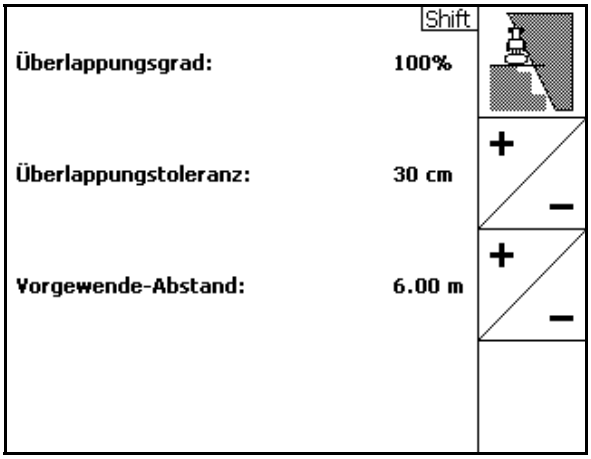


Fig. 75

On the PC:

9. Decompress the zip file.
10. Copy the data to the USB stick.
    - o BTTOPInstaller.exe
    - o Autorun.inf
    - o Terminal
    - o lib
    - o Install_GPSSwitch

- Any files that are already on the stick can remain there.

11. Insert the stick into the switched-off **GPS-Switch**.
12. Press Esc and hold, I/O Switch on the **GPS-Switch**.
13. Press buttons 1, 2, 3 (Fig. 77) in sequence.

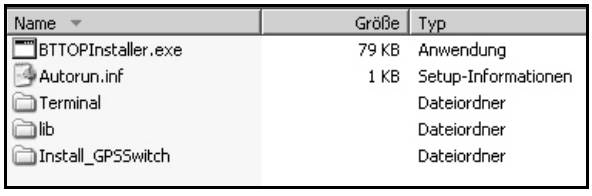


Fig. 76

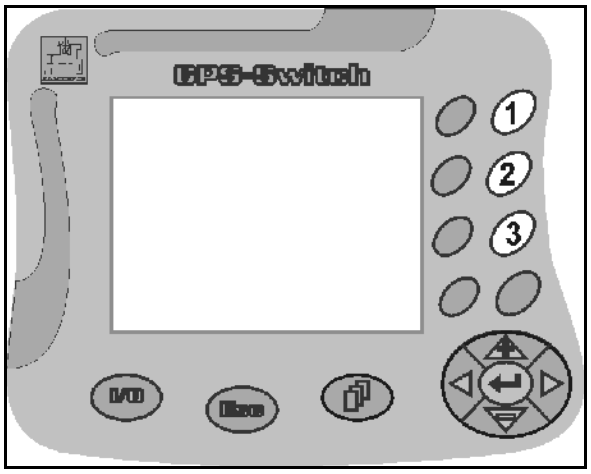


Fig. 77

→ The following appears on the display (Fig. 78).

14. to confirm.

→ The new software is installed automatically.

The installation is complete as soon as the **AMAZONE** logo appears.

15. Remove the stick and delete the five files from the computer.

16. Switch off the **GPS-Switch**.

17. Switch the **GPS-Switch** back on.

18. Select Settings/machine geometry.

19. Set up the machines again.

20. Select Setup GPS switch and configure the necessary settings.

21. Activate a selected machine for work using the **GPS-Switch**.

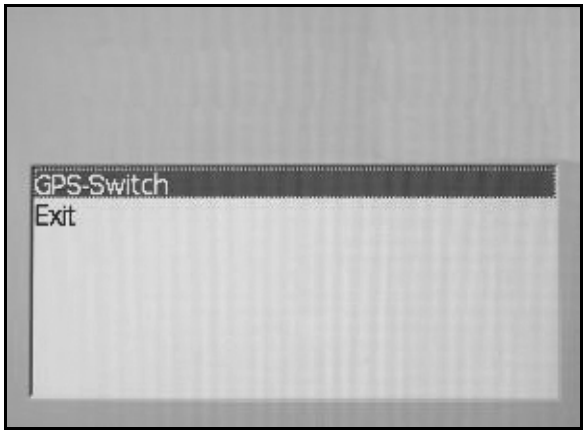


Fig. 78

9.4 Storage

Store the on-board computer in a dry place when you remove it from the tractor cab.

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