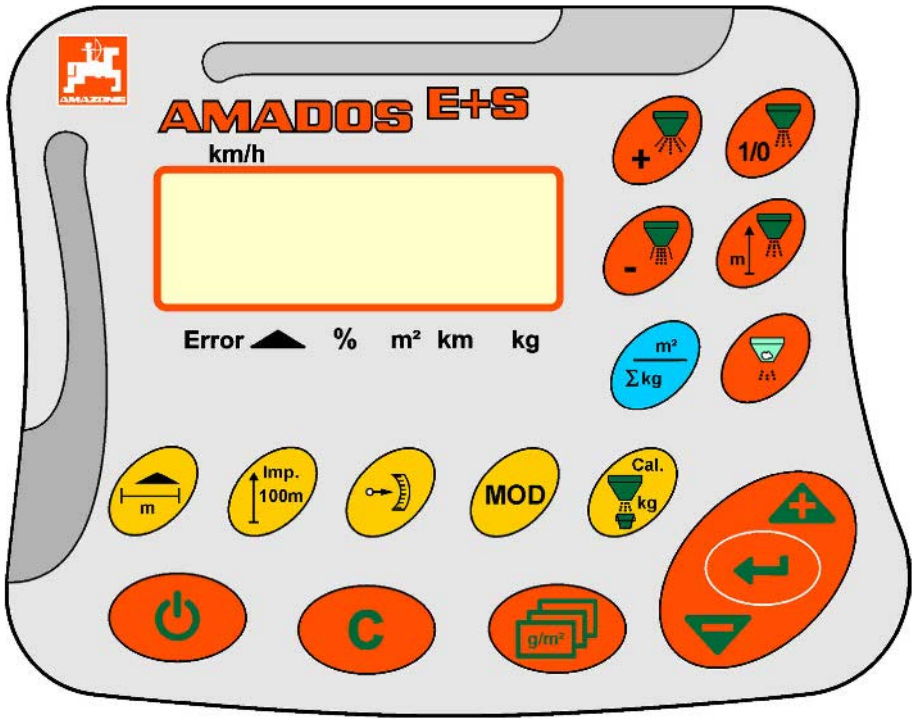
Operating Manual

AMAZONE

AMADOS E+S

On-board computer



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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.

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

This section contains important information on safe operation of the machine.

2.1 Obligations and liability

Comply with the instructions in the operating manual

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

2.2 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.

3 Product description

3.1 Intended use

The **AMADOS E+S**

- is intended as a display, monitoring and control unit for the **AMAZONE winter service spreader E+S**.

The intended use also includes:

- Compliance with all the instructions in this operating manual.
- Execution of inspection and maintenance work.
- Exclusive use of original **AMAZONE** spare parts.

Other uses to those specified above are forbidden and shall be considered as improper.

For any damage resulting from improper use:

- the operator bears the sole responsibility,
- **AMAZONEN**-WERKE assumes no liability whatsoever.

3.2 Technical data

Supply voltage	12 V 3-pin

4 Structure and function

The following section provides information on the machine structure and the functions of the individual components.

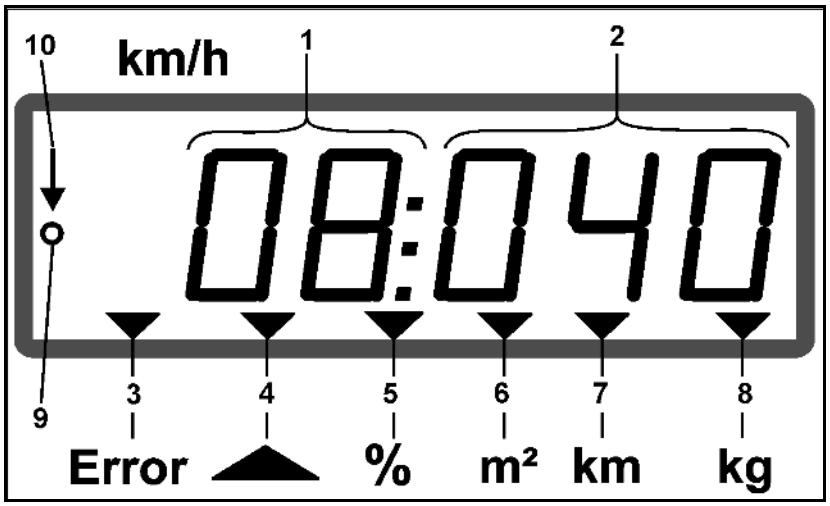
4.1 Function

The **AMADOS E+S** can be used on the **E+S** spreader as an automatic control unit.

Functions:

- Ground speed-related regulation of the spread rate.
- Remote-controlled setting of spreading width in compliance with the area-specific spread rate (quantity adjustment).
- Job administration.

4.2 Display



Information on the display:

(1) The current forward speed in [km/h] (during use)

(2) The current spread rate in [g/m^2] (during use)

(3) Display: Fault message

(4) Shutter open

(5) Display: Percentage deviation from the specified spread rate

(6) Display:

- Permanently illuminated: Spread area in job [m^2]
- Flashing: Total spread area [ha]

(7) Display: Spread distance in job [km]

(8) Display: Spread quantity in job [kg]

(9) Reception of impulses for determining distance travelled

(10) Automatic quantity regulation switched on

4.3 Keys

Orange keys for operation:

- Switch on and off

- Confirm
- Set 100% spread rate

- Increase spread rate

- Reduce spread rate

- Return to job display.
- Return to work display.
- Select job

- Start / finish automatic quantity regulation (Open / close shutter)

- Increase working width.

- Reduce working width

- Start predosing

- Eliminate blockage by completely opening the shutter.

Blue keys Work data:

- Display of the worked area [m^2] for the current job.
- Second press of key: Display of the spread distance for the current job.
- Third press of key: Display of the spread quantity [kg] for the current job.

Yellow keys for the basic setting:

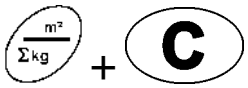
- Enter working width 

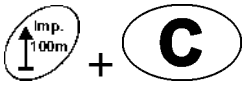
- Enter or determine impulses per 100 m 

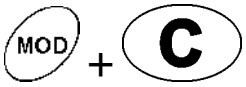
- Display spread rate as scale value 
- Select mode 

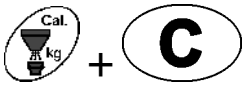
- Enter/determine calibration factor. 

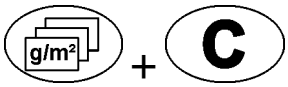
Key combinations

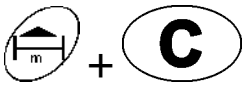
Display of the total worked area 

Start calibration run for impulses per 100 m 

Allow change of modes 

Calibrate product 

Service menu 

Adjust offset value in case of varying working widths 

5 Commissioning

This section provides information on putting your machine into operation.

CAUTION

- Before operating the fertilise spreader for the first time the operator must have read and understood the operating manual.
- See also the operating manual for the fertiliser spreader!

5.1 Connect AMADOS E+S

1. Connect the machine mounted/attached to the tractor via the machine connector (Fig. 1/1).
2. Connect the signal cable from the tractor signal socket or the sensor X (Fig. 1/2) to the AMADOS E+S

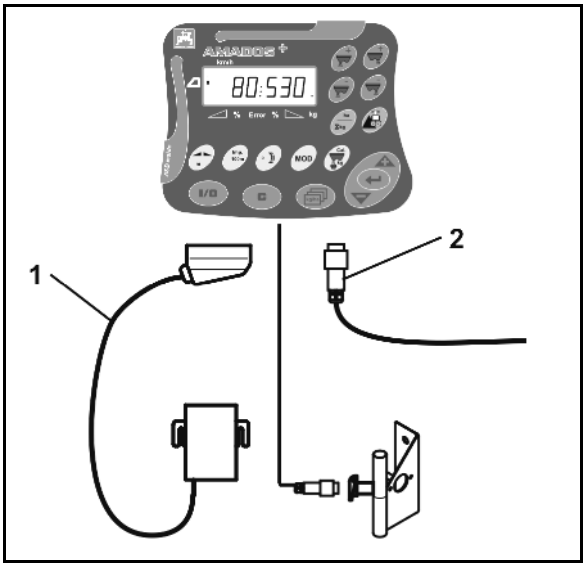


Fig. 1

5.2 Making basic setting (mode 1 to mode 9)

As soon as the work display appears after switching on, the modes 1 to 9 can be entered.

Display of modes 1-9

- Actuate the MOD key

→ Display of mode 2

- Actuate the MOD key several times

→ Display of other modes (1-9)

Display of mode 2

- After initial actuation of the MOD key, mode 2 always appears (product).
- Mode 2 can also be changed without deblocking.

Changing modes 1-9:

1. Actuate the C and MOD keys simultaneously

→ Deblock the stored modes

2. Actuate the MOD key and select the mode to be changed.
3. Enter the value with the + or − keys
4. Confirm with the ↵ key
5. With the MOD key, select another mode for change, or return to the work display with the C key.

Mode 1

Select machine type.

1 = E+S 300, E+S 750 (Setting after a reset)

2 = E+S 301, E+S 751 (factory setting)

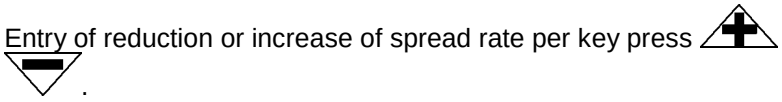
Mode 2

Select product.

1 = Grit
2 = Sand (not for E+S 01)
3 = Salt (factory setting)
4 = Gravel (not for E+S 01)
5 = Fertiliser (not for E+S 01)

Mode 3

Enter application rate increase in %.

Entry of reduction or increase of spread rate per key press  .

(Factory setting 10%)

Mode 4

Theoretical starting speed for predosing in km/h.

(Factory setting / maximum value 15 km/h)

The higher the starting speed, the greater the spread rate when starting.

Mode 5

Duration of predosing until automatic quantity regulation starts in seconds.

(Factory setting / maximum value 5 seconds)

Mode 6

Enter maximum number of jobs to be started.

(Factory setting 20, maximum value 99)

Mode 7

Enter planned mean working speed.

AMADOS+ requires the entry to determine the fertiliser calibration factor.

(Factory setting 12 km)

Mode 8

Enter theoretical travel speed for travel simulator.

With defective speed sensor

(Factory setting 0 km/h → Travel simulator off → The speed is determined from the impulses from the wheel.)

Mode 9

Enter transfer rate of serial interface.

For external job.

(57,600 baud / factory setting 19,200 baud)

5.3 Determine impulses per 100m

The AMADOS E+S requires the calibration value "Impulses per 100m" to determine

- the actual operational speed [km/h].
- the worked area.

If the calibration value is not known, it must be established by way of an "Impulses per 100 m" calibration run.

The "Impulses per 100 m" calibration value can be manually entered into the AMADOS E+S, if the precise value is known.

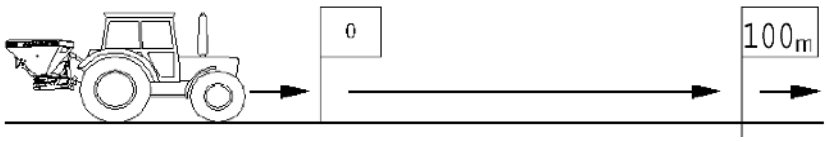
Establish the precise calibration value for "Impulses per 100 m" by way of a calibration run:

- before commissioning.
- when using a different tractor or after changing to different sized tractor tyres.
- if there is a discrepancy between the measured and the actual travel speed / distance travelled.
- if there is a discrepancy between the measured and the actual worked area.
- with different ground conditions.

The "Impulses per 100 m" calibration value must be established under the prevailing conditions. If the tractor is to be used with all-wheel drive switched on, it must also be switched on when establishing the calibration value.

Determine the impulses per 100m:

1. Measure out a calibration distance of exactly 100m.
2. Mark the start and end points.



3. Actuate the Imp. 100m and C keys simultaneously.
4. Travel a calibration distance of exactly 100m and stop.

→ Do not press any keys during the calibration travel.

Display during calibration

5. After 100m, accept the determined value with the  key.
6. Confirm with the  key.
7. Back to work menu
   - o automatically after 10 seconds
   - o with the  key

Enter the impulses per 100m:

1. With the vehicle at standstill, press  .
2. Enter the value with the  or  keys.
3. Accept with the  key.
4. Confirm with the  key.
5. Back to work menu
   - o automatically after 10 seconds
   - o with the  key.

The required minimum value for the impulses per 100 m is 200.

5.4 Enter working width

Display of working width

1. Actuate the key.

→ Current value is displayed.

2. Enter the value with the or keys.

3. Confirm with the key.

4. Set the position of the spread deflector with the / key according to the table below.

Adjustable working widths [m]	
Salt	1,5 - 4
Sand, gravel, slag	2 – 5
Fertiliser	1 - 10

Allocation of panel position to working width					
Product / **Spread deflector position**	**1** **Gravel** ↓	**2** **Sand** ↓	**3** **Salt** ↓	**4** **Slag** ↓	**5** **Fertiliser** ↓
90° ←	**5**	**5**	**4**	**5**	**X**
60° ←	**4**	**4**	**3**	**4**	
45° ←	**3**	**3**	**2**	**3**	
30° ←	**2**	**2**	**1.5**	**2**	
	Working width [m]				

- The smallest adjustable position of the spread deflector is 30°.
- The spread deflector is raised completely (90°) for spreading fertilizer und is not adjustable via the / keys!

5.5 Entering the spread rate and starting a job

- The spread rate is entered for a selected job.
- A job is started by selecting a job and entering the spread rate or actuating the  key.
- During the spreading,
  - o the spread rate entered for the started job is spread.
  - o the field plot for the started job, the total area is determined.

Display of spread rate

1. Actuate the 

key with the vehicle at standstill.

→ The last processed job appears on the display

2. Select a job with the 

key

3. Use the  or  key to enter the desired spread rate [g/m^2], e.g. "50" for a spread rate of 50 g/m^2.

4. Confirm with the  key.

Adjustable spread rates [g/m^2]	
Salt	5 - 40
Sand, gravel, slag	35 – 300
Fertiliser	1 - 300
Default value	35

Up to 20 jobs can be created as standard.

If this is insufficient, the number of jobs to be created can be increased to 99.

To do so:

1. Actuate the 

and 

keys simultaneously.
2. 

Select mode 6.
3. Use the  /  keys to enter the number of jobs to be created.
4. Confirm with the  key.

5.5.1 Display of job data

To display the job data for a required job:

Actuate the g/m² key (several times if necessary).

→ Select job.

Job data for the current job:

1. Actuate the m²/Σkg key.

→ The worked area in m^2 is displayed for the job.

Display of area

2. Actuate the m²/Σkg key again.

→ The distance travelled in km is displayed for the job.

Display of distance

3. Actuate the m²/Σkg key again.

→ The spread rate in kg is displayed for the job.

Display of quantity indicating kg

4. Actuate the C key.

→ work display

By actuating the key combination C and m²/Σkg, the total area in ha for all jobs can be displayed!

5.5.2 Deleting job data

Delete the data stored for a job as follows.

1. Actuate the g/m² key (several times if necessary).

→ Select the job to be deleted.

2. Actuate the C and ↵ keys simultaneously.

→ Job data are deleted.

3. Actuate the C key.

→ work display

5.5.3 External job (ASD)

Using a PDA computer, an external job can be transferred to the AMADOS E+S.

This job is always given the designation AE (Fig. 2).

Fig. 2

The data is transferred via the serial interface.

- For this purpose, set the transfer rate of the serial interface to 19200 or 57600 baud (mode 9).
- The Y cable is required for this.

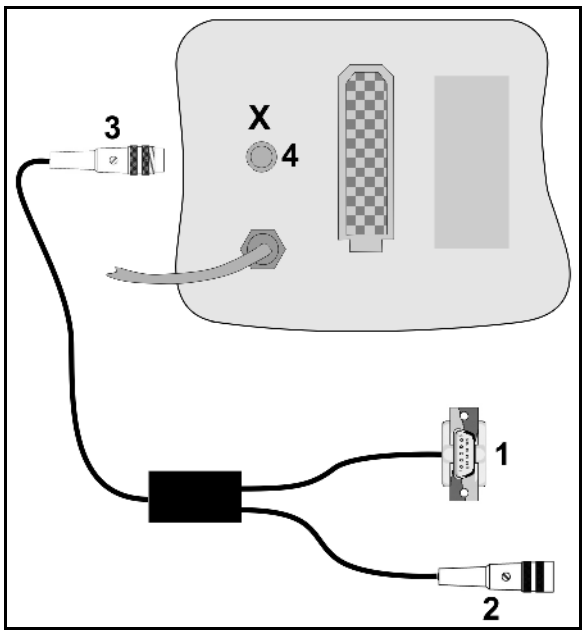


Fig. 3

Fig. 3/...

(1) Connection for PDA computer

(2) Connection for signal socket or sensor for impulses per minute.

(3) Connection to AMADOS E+S (4).

The external job is started and ended via the connected computer.

Emergency termination of the external job on the AMADOS E+S:

- Actuate the C and ↵ keys simultaneously

5.6 Carrying out spread rate check

- During the spread rate check, the calibration factor for the product is determined with
  - the machine coupled with the tractor,
  - the driven PTO shaft,
  - the tractor at standstill.
- The calibration factor can also be entered directly, if known.

DANGER

Secure the tractor and machine against unintentional rolling and lowering of the tractor's three-point hydraulic system.

The calibration factor for the product determines the regulating behaviour of the AMADOS E+S and depends on

- the flow characteristics of the product to be spread.
- the entered spread rate.
- the entered working width.

- The product flow characteristics may change even after a brief storage period.

→ Therefore again determine the calibration factor for the product before each use.

- Always again determine the calibration factor for the product
  - if the spread rate is changed.
  - if there are deviations between the theoretical and the actual spread rate.

Determine the calibration factor for the product during standstill

See also the machine operating manual.

The spread quantity for the quantity control must be completely caught.

1. Check the following entries and correct if necessary:

- Desired spread rate (job).
- Desired working width
- Product (mode 2)
- Intended average speed (mode 7).

2. Add a sufficient quantity of product to the hopper.
3. Press the 

key.
4. Enter a calibration value on the display via the  or  keys, e.g. 1.00 (standard value).

Values based on experience can be used to enter the calibration factor.

Display after entry of calibration factor

5. Press the  key and confirm.
6. Press the  key, hold and at same time press 

→ The calibration procedure starts.

Display at start of fertiliser calibration

7. Operate the PTO shaft at the speed as per setting chart.
8. Press the  key.

→ Shutter opens.

→ On the display, the shutter opening time is indicated.

9. After approx. one minute, press the  key.

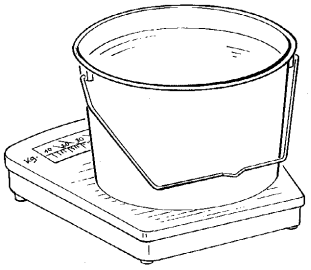
→ Shutter closes.

→ The calculated spread quantity is indicated.

Display after closing of the shutter

10. Weigh the spread product.

- The scales used must weigh accurately. Significant inaccuracies may cause deviations in the actual spread rate!
- Take the bucket weight into consideration.



11. Select the weight of the product via the  or  keys on the display, e.g. "1.50" for 1.5 kg.
12. Press the  key and confirm.

→ AMADOS E+S determines the calibration factor.

13. Press the  key and the calibration factor is displayed.

- By actuating the  key, the calibration factor can be displayed at any time.
- Note the calibration factor for manual entry before another spread rate check for the same product.

6 Use

DANGER

When using the machine, refer to the operating manual for the spreader.

Before use, enter:

- Desired spread rate (job).
- Desired working width
- Product (mode 2)
- Intended average speed (mode 7).
- Calibration factor

  or determine the calibration factor by means of a spread rate check.

During use, the accumulating data for the current job can be displayed.

Procedure for use

1. Switch on the AMADOS E+S.
2. g/m² Select the job
   - Check the specified quantity or
   - Enter the specified quantity and confirm.
3. C Back to work menu.
4. Move off and start the automatic quantity regulation.
   - o 1/0 Start the automatic quantity regulation or
   - o m start the automatic quantity regulation with predosing for the first metres.

Check whether the actual working width corresponds to that set on the AMADOS E+S.

- The spread rate is regulated automatically.
- The shutter closes at speeds below 1 km/h.
- The shutter opens at start-up

5.  After use, switch off the automatic quantity regulation.
6. Switch off the  AMADOS E+S.

Information on the display during use:

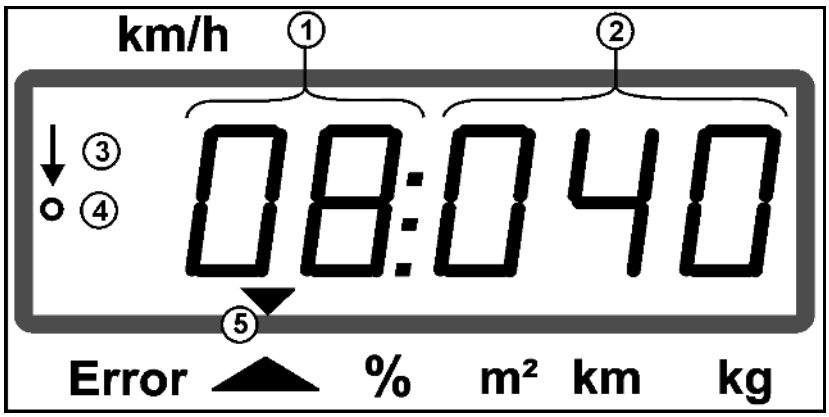
(1) The current travel speed in [km/h]

(2) The current spread rate in [g/m^2]

(3) Automatic quantity regulation switched on

(4) Reception of impulses for determining distance travelled

(5) Shutter open



Work display

6.1 Predosing

Switch on the automatic quantity regulation via the  key:

- Over the first metres, a higher dosing is set in order to ensure a sufficient spread rate for a quick start.

  Beforehand:

  - Theoretical starting speed (mode 4),
  - Set duration of predosing (mode 5).
- After the predosing, the quantity regulation starts automatically.

6.2 Setting the working width via the border spread deflector

The set working width can be adjusted during operation.

-  Raise spread deflector.

→ Larger working width.

-  Lower spread deflector.

→ Smaller working width.

- Hold down the key or press longer until the desired working width is reached.
- After two seconds, the work menu appears again.

Display of working width / spread deflector angle

- The stored working width is modified by changing the spread deflector angle.
- The adjustment of the spread rate (area-specific spread rate) takes place automatically.
- When spreading fertilizer, adjusting the working width via the spread deflector is not possible.
- Adjustable working widths, see page 16.

6.3 Blockage

Blockages in the dosing unit can be eliminated by pressing the  key.

Only possible during travel with the quantity regulation switched on!

1. Press and hold the  key.

→ The shutter opens fully, blockages are eliminated.

2. Release the  key.

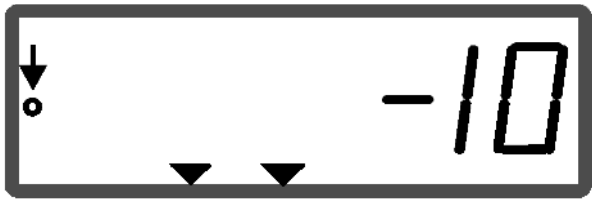
→ The shutter goes to regulation position.

6.4 Changing the spread rate during spreading

The preselected spread rate setting can be altered during spreading.

1 Actuate the  or  key.

With each press of the key, the set spread rate is changed by the entered increment.



Display of spread rate - 10 %

2. Actuate the  key.

→ Specified quantity back to 100%, work display appears.

If the key is pressed several times, the spread rate is changed by a multiple amount.

- The spread rate change in % is displayed for five seconds, then the work display reappears.
- The triangle symbol in the work display indicates a spread rate change.

6.5 Display of the bottom group shutter position

During the spreading process, the current shutter setting can be displayed.

1. Press the  key with the quantity regulator switched on.

→ Display of shutter position.

→ The work menu appears again after two seconds.

Display of current shutter position 0-55

6.6 Residue draining / cleaning

Open the shutter to drain the residue and clean the hopper!

1. Actuate the  key with the machine at standstill.
2. Actuate the  key.

→ The shutter opens fully.

3. Actuate the  key.

→ Shutter closes.

Display of current shutter position 0-55

7 Faults

7.1.1 Alarm messages

Alarm message	Cause	Remedy
A10	The spread rate cannot be maintained.	Reduce travel speed.
A11	No specified value (start of calibration)	Start job and enter specified value.
A12	No working width (start of calibration).	Enter working width
A13	The value from the spread width sensor is incorrect.	Check cable. Motor or sensor defective.
A14	The value from the spread rate sensor is incorrect.	Check cable. Motor or sensor defective.
A15	No calibration factor.	Enter / determine calibration factor.

Display of alarm message

7.1.2 The true working width and the set spreading width are not identical

When the true working width and the set spreading width are not identical, an offset of the spread deflector setting can be made.

1. To select offset: Press the  and  keys simultaneously.

→ Display working width / spread deflector angle

Working width [m] / spread deflector angle [°]

2. Raise or lower the spread deflector using the  or  keys until the true working width is reached.

→ Only the value of the diffusing panel angle is modified on the display. The value of the working width remains constant.

3. Store with the  key.

The offset value remains stored until the computer is reset.

8 Cleaning, maintenance and repairs

8.1 Cleaning

CAUTION

Take great care when cleaning the E+S with a high-pressure cleaner.

Never clean the setting motor with a high-pressure cleaner, as this could damage the setting motor!

8.2 Storage

Store the board computer in a dry environment when removing it from the tractor cab.

8.3 Service menu

To limit a possible malfunction, the input of data can be indicated on the display.

1. Actuate the C and g/m² keys simultaneously.

→ Input E1 is displayed.

2. Actuate the + or − keys.

→ To display the inputs E1 to E3

3. Actuate the C key.

→ Back to work display

Display, input 1

E1	Wheel impulses	The impulses from the distance sensor or the signal socket of the tractor are counted.
E2	Analogue value of rate slider	Actuate the + or − key. → Setting motor moves, voltage at sensor is displayed (0.5V -4.5 V).
E3	Analogue value of border spread deflector	Actuate the + or − key. → Setting motor moves, voltage at sensor is displayed (0.5V -4.5 V).

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