

HORSCH DrillManager ME

SW 4.16



Operating instructions

Read thoroughly prior to starting up!
Keep operating instructions in a safe place!

- Translation of the Original Operating Instructions -

Machine Identification

The corresponding data is to be entered into the list below upon receiving the machine:

Serial number:
Machine type:
Year of construction:
Initial installation:
Fittings:
.....
.....
.....

Publication date of Operation Manual: 03/2007

Address of Retailer: Name:
 Road:
 Town/City:
 Tel.:

 Customer No.:
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Introduction

Foreword

Before operating the machine, read the operating Instructions carefully and follow these. The purpose of the instructions is to describe how the DrillManager is operated and its mode of operation and, thus, to facilitate its use.

As a result, accidents are prevented, repair costs and downtimes are lowered and the reliability and service life of your machine and equipment increased.

Pay attention to the safety instructions! HORSCH will not accept any responsibility for any damage or malfunctions resulting from failure to comply with the operating instructions.

The operating instructions are to be used by any person working with or on the machine or responsible for the machine.

Examples:

- operation and transport (including preparation, remedying of faults in the operating sequence, servicing),
- maintenance (maintenance and repair).

The right is reserved to change illustrations as well as information regarding technical data and weights in these operating instructions for the purpose of improving the machine or the additional equipment.

In accordance with its intended purpose, the HORSCH DrillManager may only be used to control and monitor seeders and their components and to apply liquid fertiliser.

Any further usage shall be deemed not be in accordance with its intended purpose.

Warranty claims

Warranty claim forms must be sent through your local HORSCH dealer to the HORSCH Service Department in Schwandorf.

It is only possible to process claims which have been correctly completed and submitted no later than four weeks after the damage occurred.

Exchange parts, which require the old part to be returned, are marked with an "R".

Please clean and empty such parts and return them within 4 weeks, along with a claim form and an exact description of the fault, to HORSCH.

Exchange parts, which do not require the old part to be returned. Please keep such parts for 12 weeks until a decision has been made on the action to be taken.

Warranty repairs, which are to be carried out by a third party company, or which are expected to take more than 10 working hours, must be agreed upon in advance with the Customer Service Department.

DrillManager ME

The HORSCH DrillManager ME is an electronic control unit for drills and their components.

It regulates, monitors and controls all connected components on the drill.



You should only switch on the DrillManager after you have read the operating instructions and are familiar with the operation.

Strict compliance with the applicable accident prevention instructions and other established regulations concerning technical and industrial health and safety is mandatory when working with the DrillManager.

Description

The HORSCH DrillManager ME is a complete system in which the modules included in the equipment must only be activated.

The complete system consists of the following components:

- Computer
- Monitor
- Modules, depending on machine type and equipment, for:
 - one or two metering drives or one metering drive and one liquid fertiliser control
 - hydraulic control for raising, wings and bout marker control
 - half-width control
- Sensors for:
 - Fan
 - forward speed (radar)
 - hopper empty indicator (2 channels)
- Connection for work signal
- Off-switch

Computer

All components and sensors are connected to computer and monitor by means of the wiring loom.

The computer uses a bus system or the ISO bus system to communicate with the individual components and sensors.

It receives the information, evaluates it and displays the operating status and data on the monitor.

If entered or fixed default values are exceeded or fallen short of, or in the case of malfunctions the monitor display is interrupted and the fault is indicated.

The monitor thereby identifies the corresponding component or the limit value that has been exceeded.



Computer

The computer is installed in a suitable place on the machine.

Stickers on the computer inform about the hardware and software status.



Do not clean the computer with a high pressure cleaner or a direct water jet.

Wiring loom of machine

The wiring loom is adapted to match the corresponding machine type and prefabricated with plugs for all equipment variants.

In order to avoid malfunctions caused by dirt, all open plugs must be closed with blind caps or similar.



Wiring loom

Pin assignment in all 3 pole plugs

- 1 - ground cable, white
- 2 + plus cable, brown
- 3 signal cable, green

Plug designations:

- T Hopper
- B Bridging metering unit
- G Fan

- D1 Speed monitoring, shaft 1
- D2 Speed monitoring, shaft 2

- K Ball valve (liquid fertiliser)
- D Flow sensor (liquid fertiliser)
- 2 pole Flat plug with diode - shut-off valve

Cable 8 pole automatic tram line control set to „Magnet“.

- 1 + Wings right
- 2 + Wings right
- 3 + Wings left
- 4 + Wings left
- 5 + Pre emergence markers right
- 6 + Pre-emergence markers left
- 7 - Ground all
- 8 - Ground all

Cable 8 pole automatic tram line control set to “Motor”.

- 1 + / - Motor right
- 2 - / + Motor right
- 3 + / - Motor left
- 4 - / + Motor left
- 5 + Pre emergence markers right
- 6 + Pre-emergence markers left
- 7 - Ground
- 8 - Ground

6 pole hydraulic control, raising, wings and track marker.

- 1 + Track marker left
- 2 + Track marker right
- 3 + Lifting / lowering
- 4 + Wings
- 5 - Ground all
- 6 - Ground all

5 pole half-side control

- 1 Adjustment motor + / -
- 2 Adjustment motor - / +
- 3 Signal right
- 4 Signal left
- 5 Signal output


S Signal half side control middle position

Installing the DrillManager

For all machines with a DrillManager drill control, the basic equipment must first be mounted to the tractor in case of initial installation.

The cables for the basic equipment must be directly connected to the tractor battery. The cables must be protected against chafing and the insulation must not be damaged.

The battery connections must have good contact. Assembly faults will lead to voltage drop and indefinable error messages and failures.


 The cables must under no circumstances be connected to any other plugs in the cab.

DrillManager Müller (ME)

The basic equipment is delivered with two 6 mm² and two 2,5 mm² cables for electric power supply.

For deliveries up until approx. May 2006 only the two 6 mm² cables must be connected (there is only one 50 A fuse installed).

From around May 2006 all cables must be connected (there is an additional 10 A fuse for the red 2.5 mm² cable).

 The monitor should not obstruct the field of vision to the road

Installation:



Basic equipment with monitor

- Assemble the monitor bracket in a suitable place within the view and the operating range of the driver.
- Route the thick cable to the battery, extend it if necessary.
- Connect both fuse holders tightly and durably with the cable.
- Connect the two red cables tightly with battery plus and the two black cables with battery minus.
- Fasten the monitor bracket to the back of the monitor and plug the connecting cable in at the bottom of the monitor.

Monitor

The monitor is plugged on the pre-assembled bracket in the tractor and connected to the computer by means of a cable.



Monitor with display and keyboard

1. On / Off button
2. System control changeover for drill program or service
3. Membrane keyboard and display
4. Keys to select, set and change numerical values and functions.

The keys (3) on the display have no fixed functions assigned to them. They will always switch the function currently displayed.



The displayed screen contents may vary from the illustration depending on the respective program version.

Operation

Switch on

Press the On / Off button momentarily.

After a new start and after changing or reprogramming of the computer the data will be loaded from the computer.

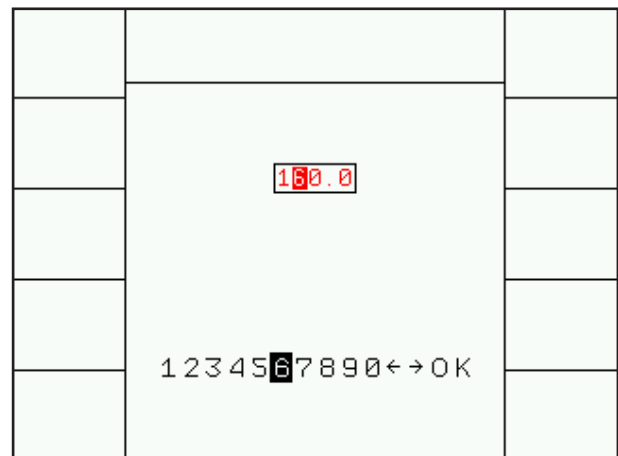
Before initial start-up some settings must be made in the system.

Setting and changing numerical values

When making settings the desired numerical group is selected with the + / - keys. For this purpose press the buttons, until the corresponding number is highlighted by a frame.

Then press the "Return"-key.

The number appears marked and the numbers 1 - 10 with two arrows and OK are displayed underneath.



Changing numerical values

If the number is not to be changed press "Return", if a change is required select the desired number with the + / - and confirm with "Return".

The system will automatically change to the next number.

With the arrow keys the desired cipher can be directly selected.

If various terms have been predetermined, these will also be highlighted with the + / - keys and confirmed with "Return".

Monitor and system setting

Press key (1) to switch over to the system control, press keys (2) +/- to select service and confirm with "Return".



Press arrow keys (3) and (4) to scroll through the menus and make the corresponding settings.



Menu 1

Display of display version, e.g. 3.14.
The drill program software version is displayed in diagnostics.

Menu 2

Screen settings for "Brightness and Contrast", use the membrane keyboard to set accordingly.

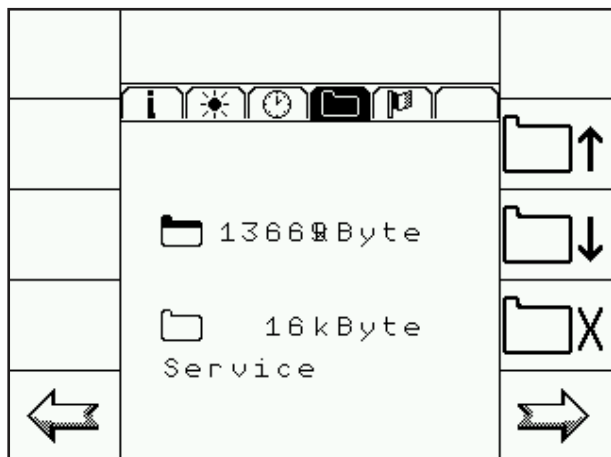
Menu 3

Set date and time.

Menu 4

Information about available memory in computer and monitor.



In case of reprogramming or when replacing the computer delete the monitor memory (X) by pressing key (5). In case of a restart the program is reloaded from the computer.



Deleting the memory

Menu 5

Language selection

		
	Sprache: <input type="text" value="de"/>	
	Dezimalpunkt: /	
	Zeitformat: 24 h	
	Datumsformat: ttmjyyy	
	Längeneinheit: metrisch	
	Flächeneinheit: metrisch	
	Volumeneinheit: metrisch	
	Masseneinheit: metrisch	

Language selection

Press the “Return”-key to open the list with possible languages. Use the + / - keys to select the language and press “Return” to confirm. Then switch the monitor off and on again. The new language will be loaded from the computer into the monitor.

The following 12 languages are currently available:

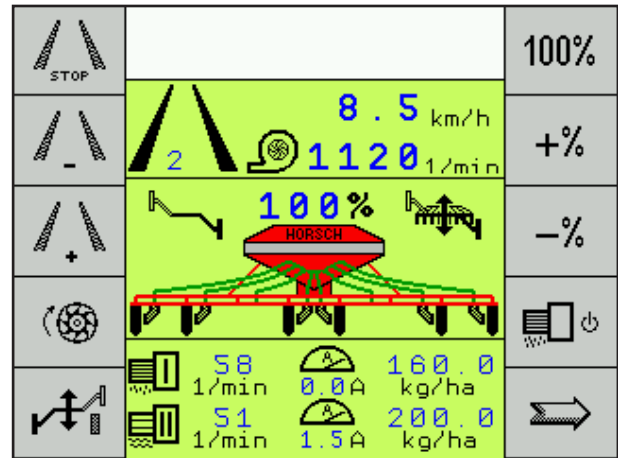
German	de
English	en
French	fr
Danish	da
Polish	pl
Czech	cs
Romanian	ro
Spanish	es
Swedish	sv
Hungarian	hu
Serbian	sr
Russian	ru

Press the system change-over key (1) to return to the selection, press the + / - key to select the drill program and confirm with “Return”.

Screen display work page

After switching on the work page will always appear as the initial page.

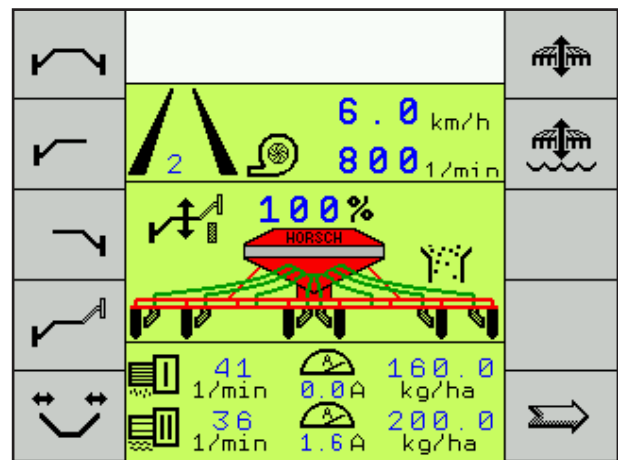
The displayed image will always depend on the setting and the available equipment.



Work page, first page

I.e.:

Switched tram line, hydraulic bout marker control and two metering units.



Work page, second page

Bout marker in post mode and seed monitoring.

Function symbols

The symbols in the display represent the functions of the corresponding keys.



Stop - override button for tram line:

The key prevents switching over of the tramline rhythm after hydraulic lifting of the machine. The function is indicated with STOP between the tracks.



The tram line rhythm is offset by one track with every operation of the key.



The track number is displayed between the tracks.

When tramlining the two tracks show bold black.

In addition, the shut off coulters no longer appear in the display during the sowing.

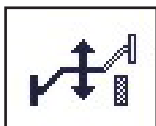
If the machine is equipped with the hydraulic bout marker control, the symbol for the alternating bout marker will appear instead of the "Tram Line +" symbol when pressing "STOP Tram Line".



This button can now be used to change the side for the bout marker.



At standstill but with "switched on drill function" activated the metering unit will start up over a specified time. If the computer receives a speed signal during this period, the computer will take over the control.



Post mode:

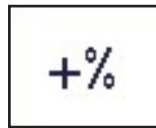
The post mode disables the hydraulic "Lifting" function.

When operating the control unit only the track marker will be hydraulically operated. The machine remains in working position. The work signal is hydraulically blocked and the tram line will not switch further.

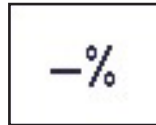


Seed quantity 100 %:

If the seed quantity had been adjusted with the +% or -% keys, pressing this key will switch back to the default seed quantity in kg/ha.



With the adjustment keys +% or -% the seed quantity can be set and reset in several steps. The seed quantity is displayed in % by the display above the hopper. The percentage step can be changed in the machine data. There you can also select whether only the seed quantity is to be changed, or also the fertiliser quantity.



With the adjustment keys +% or -% the seed quantity can be set and reset in several steps. The seed quantity is displayed in % by the display above the hopper. The percentage step can be changed in the machine data. There you can also select whether only the seed quantity is to be changed, or also the fertiliser quantity.



Switching the drill function ON / OFF:

With the drill function switched off the display will show STOP under the drill.

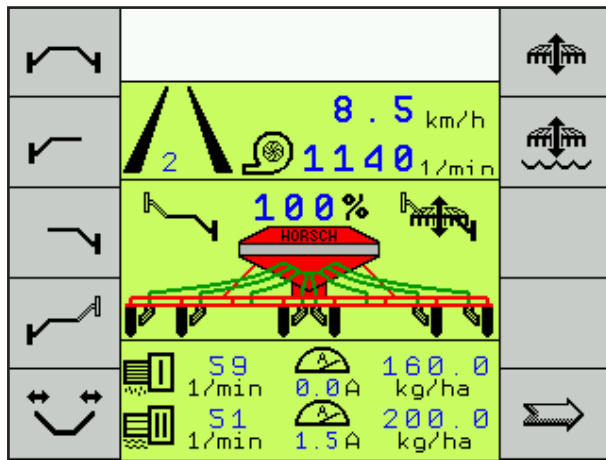
If the drill function is switched on, the drill is lowered to work position and the computer receives a speed signal, the computer will start the control process.



Continue to next page:

If the hydraulic bout marker control or the half width control is activated, the next page will show the menu for bout marker control, lifting and folding of the machine half width shut off.

Bout marker and hydraulic control



Menu image second work page - hydraulic functions

The enabled functions appear in the display next to the drill.



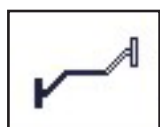
Both bout markers are lifted out or lowered together with the machine.



Only the left hand bout marker will be operated.



Only the right hand bout marker will be operated.



Alternating mode: Left and right hand bout markers lift and lowers alternatively
This is the normal drill work mode.

When switching on this bout marker control also always activates the hydraulic "Lifting" function.



Folding the machine

With all foldable machines this key is used to switch the hydraulic valve block over to "Folding".

The functions "Lifting / Lowering" and the drill function are switched off.



Lifting and lowering the machine.

The function "Lifting / Lowering" is automatically activated when activating the bout marker function. If the bout marker is switched on, the first actuation of the key will switch off the bout marker and the second actuation will disable the "Lifting / Lowering" function.



"Wet hole" function

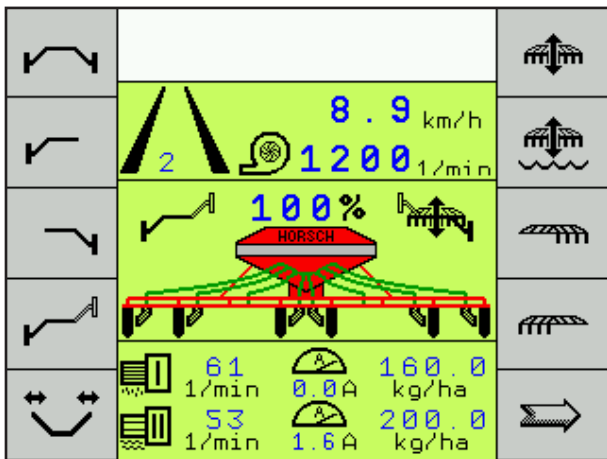
In certain situations, e.g. if the machine sinks in at very wet patches in the field, this function can be used to raise the machine. The work signal is thereby not interrupted and the tram line will not switch further.

Return to the normal drill function by pressing the key again and by pressing the key for the desired bout indicator function.



Continue to next page:

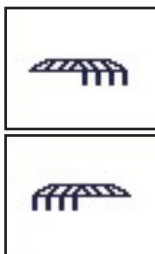
Half width shut-down



The signals for both end positions are transmitted from the motor to the computer. The signal for middle position is switched by the sensor on the metering unit.



Continue to next page:



After selecting the half width shut-off in the machine configuration, the two symbols for left and right hand on the second work page.

As soon as a key for shutting off a half width is pressed, the corresponding half width will flash in the displayed graph, until the sensor sends a signal to the computer when end position is reached.

In end position the closed half side is hidden.

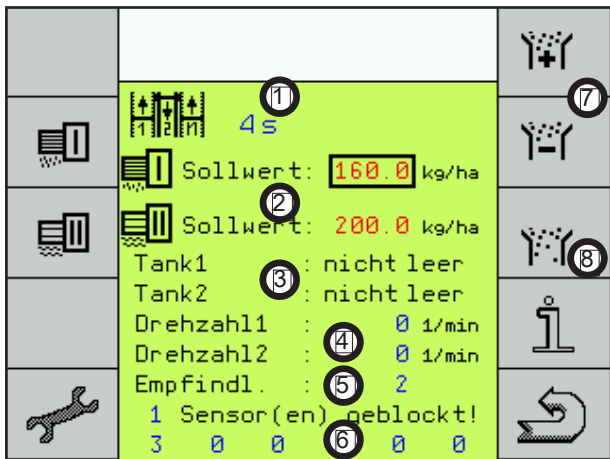
The seed quantity is reduced by half, the seed quantity display in kg/ha remains unchanged, because the working width has also been halved.

After pressing the same key again the total working width is available again and the display shows the complete machine.

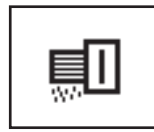
Third page with seed flow monitoring

Depending on the design of the drill, e.g. with twin hopper, liquid fertiliser facility or seed flow monitoring, further symbols will appear on the third “work page”.

This contains the displays that are not permanently needed during sowing and these keys can be used to switch to further functions.



From this page you can switch to further menus.



Turning off seed



Turning off solid fertiliser (twin hopper version)



Machine data



Result display



Back to first page

Available displays:

1. The number of the tram line rhythm from the table - not the number of bouts.
2. The required rate for seed and fertilizer quantities in kg/ha or, for liquid fertiliser, in l/ha.
3. Hopper 1 - filling level indicator for seed and fertiliser hopper.
Hopper 2 - monitoring of bridging in metering unit.
4. RPM-meter for two shafts.
5. Sensitivity setting for seed flow monitoring.
6. Display of amount and numbers of blocked seed hoses.
7. Plus and minus key to set the sensitivity of seed flow monitoring.
8. Switch-over to the seed flow monitoring diagnostics.

Seed calibration

Before starting the seed calibration the basic setting for seed and metering quantities must be entered to enable calculation of the working speed.

The metering unit must have the correct rotor installed.

Rotor selection

















The rotor is dependent on seed quantity, working speed and working width of the drill.

The following tables show the minimum and maximum seed quantities at various working widths and the available rotor sizes for working speeds of 5, 10 and 15 km/h.

Other rotor sizes for special applications are available on request.

The setting tables are based on 1 kg/litre. With all types of seeds the specific weight must be taken into account and according to this, e.g. a larger rotor must be installed in case of a lower seed weight.

Entering the basic setting

	 999	
	 Sollwert: 160.0 kg/ha	
	 Sollwert: 200.0 kg/ha	
	Tank1 : nicht leer	
	Tank2 : nicht leer	
	Drehzahl1 : 0 1/min	
	Drehzahl2 : 0 1/min	
	Empfindl. : 0	
	alle Sensoren geblockt !	

At “basic setting” select the metering unit for seed and fertiliser and enter the required seed or fertiliser quantity in kg/ha with the + and - keys.

Calibration








Seed calibration - metering unit 1



Fertiliser calibration - metering unit 2

Press key “Calibration metering unit 1”.

The menu for turning off the seed is displayed.

	SAATGUT - ABDREHEN	
	Abdrehdrehzahl korrekt?	
	Dosierkammern gefüllt?	
	1. Starten : 	
		
	Abdrehdrehz.: 60 1/min	
	Geschw. min.: 0.9 km/h	
	Geschw. max.: 7.8 km/h	

The display reminds you about the setting of the metering unit calibration speed and the filling of hopper and metering unit.

Calibration speed?

The calibration speed can be selected with the “Return”-key and set with the + and - keys. The default setting is 60 revolutions per minute. This is sufficient under normal conditions.

If work is carried out mainly at high metering speeds, the calibration speed should be increased to enable almost similar filling of the metering cells.

Metering unit filled?

The hopper must be sufficiently filled with seed before starting the calibration process. However, the hopper should not be filled completely, this applies particularly for fine seeding, to enable easier exchange of rotor if it had been incorrectly selected.

For correct calculation of the seed quantity all cells in the rotor should be filled when starting the seed calibration.

For this purpose press the key “Metering Unit”. The rotor will rotate as long as specified in the “Configuration 3” menu under “prime rotor time”, or until the key is pressed again.

Calibration quantity

During the “Seed calibration” the computer receives the calculation information required for exact metering control.

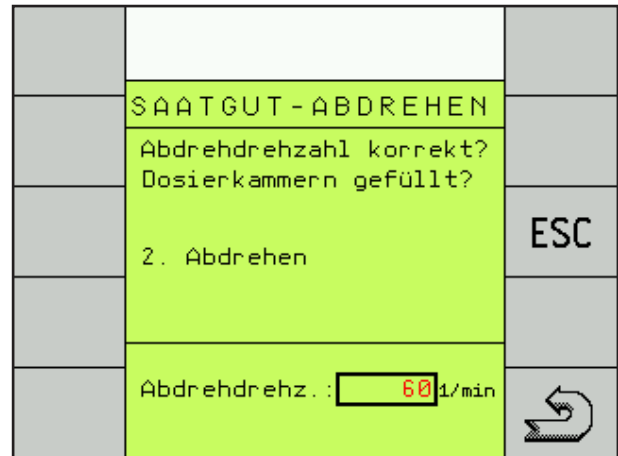
It requires the seed weight taken from the metering unit during seed calibration as an input value.

In order to keep measuring inaccuracies low, as much seed as possible should be metered out.

Starting calibration

Place a container or attach a calibration bag under the metering unit, depending on the machine.

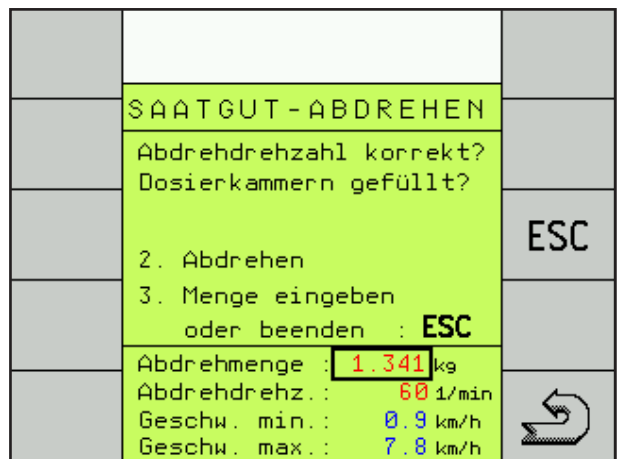
Press the traffic light button to start. A second page “Calibration” appears.



With the “ESC”-key you can abort the process at this point and start it again.

The “Return”-key brings you back to the work page.

- Operate the calibration switch on the machine. The rotor turns and fills the calibration container.
- After switching off calibration, the menu to enter the calibration quantity appears.



- Remove the calibration container and remove any seed that may have remained in the venturi area.
- Weigh the metered out seed.
- Press the “Enter”-key to select “Calibration quantity” and enter the weight with the + and - keys.
- After entering the calibration weight the possible speed range will be calculated and displayed.

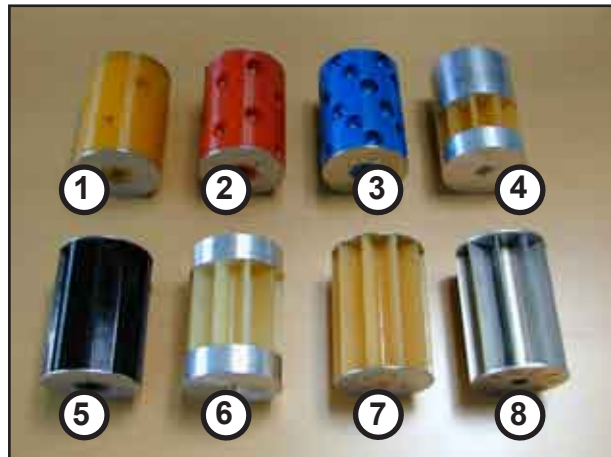
If the displayed speed range corresponds with your desired drill speed, you may start the fertiliser calibration or, in case of single hopper, start the sowing process.

If the desired working speed is not within the predetermined range, the rotor must be replaced by a bigger or smaller one, as required.



The calibration process must in this case be repeated.

Rotors



No.	Size cm ³	Colour	
1	20	yellow	not suitable for beans and solid fertilisers
2	40	red	
3	100	blue	
4	170	yellow / alu	
5	250	black	
6	320	yellow / alu	
7	500	yellow	
8	800	metal	



Size cm ³	Cell shape / cell size	Number of cells
3,5	half-round, radius 4 mm	10
7	2 cell discs 3.5 cm ³	20
5	Sinking approx. 19 x 3 mm	12
10	2 cell discs 5 cm ³	24
10	Sinking approx. 23 x 5 mm	12
20	2 cell discs 10 cm ³	24

Rotor selection

Working width		3m		4m		6 m		7.5 m	
		Seed quantity kg/ha		Seed quantity kg/ha		Seed quantity kg/ha		Seed quantity kg/ha	
Rotor	Speed	min	max	min	max	min	max	min	max
3,5	5	2	18	2	13	1	9	1	7
	10	1	9	1	7	1	4	0	4
	15	1	6	1	4	0	3	0	2
5,0	5	3	25	2	19	2	13	1	10
	10	2	13	1	9	1	6	1	5
	15	1	8	1	6	1	4	0	3
7,0	5	4	35	3	26	2	18	2	14
	10	2	18	2	13	1	9	1	7
	15	1	12	1	9	1	6	1	5
10	5	6	50	5	38	3	25	2	20
	10	3	25	2	19	2	13	1	10
	15	2	17	2	13	1	8	1	7
20	5	12	100	9	75	6	50	5	40
	10	6	50	5	38	3	25	2	20
	15	4	33	3	25	2	17	2	13
40	5	24	200	18	150	12	100	10	80
	10	12	100	9	75	6	50	5	40
	15	8	67	6	50	4	33	3	27
100	5	60	500	45	375	30	250	24	200
	10	30	250	23	188	15	125	12	100
	15	20	167	15	125	10	83	8	67
170	5	102	850	77	638	51	425	41	340
	10	51	425	38	319	26	213	20	170
	15	34	283	26	213	17	142	14	113
250	5	150	1250	113	938	75	625	60	500
	10	75	625	56	469	38	313	30	250
	15	50	417	38	313	25	208	20	167
320	5	192	1600	144	1200	96	800	77	640
	10	96	800	72	600	48	400	38	320
	15	64	533	48	400	32	267	26	213
500	5	300	2500	225	1875	150	1250	120	1000
	10	150	1250	113	938	75	625	60	500
	15	100	833	75	625	50	417	40	333
800	5	480	4000	360	3000	240	2000	192	1600
	10	240	2000	180	1500	120	1000	96	800
	15	160	1333	120	1000	80	667	64	533

Working width		8 m		9 m		12 m		18 m	
		Seed quantity kg/ha		Seed quantity kg/ha		Seed quantity kg/ha		Seed quantity kg/ha	
Rotor	Speed	min	max	min	max	min	max	min	max
3,5	5	1	7	1	6	1	4	0	3
	10	0	3	0	3	0	2	0	1
	15	0	2	0	2	0	1	0	1
5,0	5	1	9	1	8	1	6	1	4
	10	1	5	1	4	0	3	0	2
	15	0	3	0	3	0	2	0	1
7,0	5	2	13	1	12	1	9	1	6
	10	1	7	1	6	1	4	0	3
	15	1	4	0	4	0	3	0	2
10	5	2	19	2	17	2	13	1	8
	10	1	9	1	8	1	6	1	4
	15	1	6	1	6	1	4	0	3
20	5	5	38	4	33	3	25	2	17
	10	2	19	2	17	2	13	1	8
	15	2	13	1	11	1	8	1	6
40	5	9	75	8	67	6	50	4	33
	10	5	38	4	33	3	25	2	17
	15	3	25	3	22	2	17	1	11
100	5	23	188	20	167	15	125	10	83
	10	11	94	10	83	8	63	5	42
	15	8	63	7	56	5	42	3	28
170	5	38	319	34	283	26	213	17	142
	10	19	159	17	142	13	106	9	71
	15	13	106	11	94	9	71	6	47
250	5	56	469	50	417	38	313	25	208
	10	28	234	25	208	19	156	13	104
	15	19	156	17	139	13	104	8	69
320	5	72	600	64	533	48	400	32	267
	10	36	300	32	267	24	200	16	133
	15	24	200	21	178	19	133	11	89
500	5	113	938	100	833	75	625	50	417
	10	56	469	50	417	38	313	25	208
	15	38	313	33	278	25	208	17	139
800	5	180	1500	160	1333	120	1000	80	667
	10	90	750	80	667	60	500	40	333
	15	60	500	53	444	40	333	27	222


Seed Check

The Seed Check is a check of the seed calibration and, during the sowing process, for the metering accuracy.

The same procedure as for seed calibration must be performed for this purpose. The computer retrieves the calibration data from the last seed calibration and uses the revolutions of the new seed calibration to calculate a new value for the calibration quantity.

When switching off the calibration switch, it shows this value under "Calibration quantity" in kg.







If the same seed is used as for the previously performed seed calibration, the weight of the new seed calibration must be identical with the display

 In case of deviations correct the value and repeat the control if required.

Performance data



The "i"-key is used to display the seed and area output.

		↑
	ERGEBNISSE  → Menge : 221 kg Fläche : 1.54 ha Strecke : 2.58 km Zeit : 0.3 h	
		↓
	 Menge : 279 kg Fläche : 1.54 ha Strecke : 2.58 km Zeit : 0.3 h	
		

These data can either be completely deleted with the left hand "CE"-keys, or individually selected with the right hand arrow keys and reset to "0" with the right hand "CE"-key.



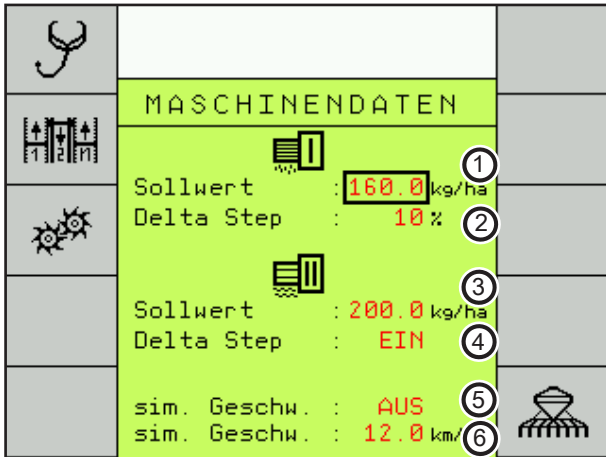
Back to the drill program:
First "Work Page".

Input of machine data



The machine data must be entered before initial start-up of the machine.

After switching on, the first page of the main menu is displayed. Use the arrow key to switch to the second page. The key for machine data opens a further selection page.



1. Specification of seed quantity in kg/ha.
2. Adjustment % value for seed quantity.
3. Specification placement quantity solid fertiliser in kg/ha or liquid fertiliser in l/ha.
4. Selection of whether the quantity of solid or liquid fertiliser is to be adjusted with the %+ or %- key during placement.
5. In case of a missing speed signal an emergency program can be switched on and sowing can be continued with the simulation speed.
6. The simulation speed for the emergency speed program can be changed here. The metering motor in this case runs with the same speed as the speed specified.



Back to the drill program:
First "Work Page".



Press the machine configuration key for about 5 seconds to enter the fixed machine data.

Configuration 1



Continue to page "Configuration 2, 3 and 4"



Return to work page

Machine type

Here you can select from Drill and Maistro. The program has been prepared for both machines. Switching over is only required when towing a Maistro with ME-control.

Number of hopper sensors

Here you should normally enter "2". There are 2 inlets (T and B) available. From these connection (T) is used to monitor the seed and fertiliser hoppers and connection (B) serves the purpose of monitoring bridging in the metering units.

Hopper monitoring „T“

The sensor for hopper monitoring can be installed inside the seed hopper in various positions.

The sensor should always be positioned in such a way, that in case of an alarm sowing can still be continued to the headland of the field. Metering quantity and length of field must thereby be taken into account.

For fine seeding the sensor must be installed in lowest position and covered with seed when filling the hopper.

Several hoppers can be connected to the hopper monitoring cable and monitored.

The cable is thereby extended for further connections by a Y-cable.

In case of an alarm it can therefore not be determined which hopper has caused the alarm.

An alarm for an empty hopper only occurs once. It must be confirmed with the “Escape”-key.

The alarm function will only be activated again, after the hopper sensor has been covered by seed during filling.

Bridging „B“

The sensor for bridging monitoring is installed in the metering unit.

In case of bridging in the seed or fertiliser hopper the metering unit will run empty and no seed or fertiliser will be placed.

In case of an alarm you should therefore stop and remove the bridging immediately.

Several metering units can be connected to the bridging monitoring cable and monitored.

The cable is thereby extended for further connections by a Y-cable.

In case of an alarm it can therefore not be determined which sensor has triggered the alarm.

The alarm for bridging only occurs once. It must be confirmed with the “Escape”-key.

The alarm function will only be reactivated after the fault has been corrected and the metering unit is full again.

Bout marker control

The bout markers are controlled by the computer. The bout marker working mode can be selected in the monitor. This function is always hydraulically connected with the function "Lifting machine" and can be extended with an additional valve block "Folding machine" for use with foldable machines.

Fertiliser control

If the machine is equipped with twin hopper or with liquid fertiliser facility, the system must here be selected.

Half width control

If a half width control is installed you must select LINAK or WINGS as control, depending on the system. The LINAK adjustment motor is mounted to the metering unit.

Tram line system

In the tram line system one must choose between "Magnet" and "Motor".

The magnetic valves are switched on by permanent current.

The motors receive 3 seconds current to close the valves and are energized for 3 seconds in opposite direction to open the valves



If the wrong system is selected, the magnetic valves may destroy diodes or the motors may be subjected to permanent current and damaged. You should therefore never change this setting!

Seed flow monitoring

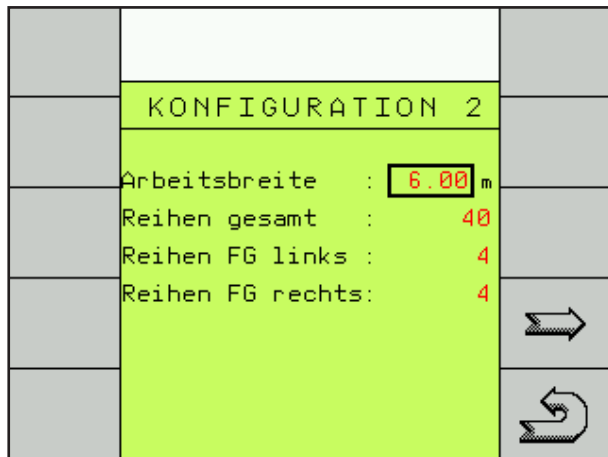
If the machine is equipped with a seed flow monitoring system, you should select "yes" at this point.

After confirming the input with "Return" another line to enter the number of seed flow sensor is displayed.

Number of sensors

Enter the number of installed seed flow sensors. If less sensors are entered than are installed, then the other sensors will not be taken into account.

Configuration 2



Working width

Enter the machine width in metres with two decimal digits.

Total rows

Enter the number of drill coulters. This input is required for the calculation of quantity reduction with switched tram line.

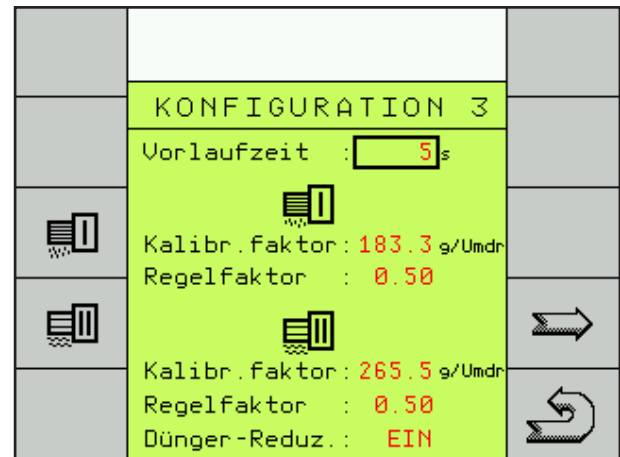
Rows FG left

Enter the number of seed hoses on the left hand side of the machine.

Rows FG right

Enter the number of seed hoses on the right hand side of the machine.

Configuration 3



Seed calibration

This menu can be used to run a seed calibration (see seed calibration).

Prime rotor time



The rotor rotates as long as specified under prime rotor time.

A setting of 5 seconds is enough to e.g. place seed in field corners.

If the computer receives a speed signal during this period, the computer will take over the control.

Calibration factor

The calibration factor value for seed and fertiliser is used to save weight determined in the seed calibration in gram per revolution.

The calibration factor can also be directly entered as calibration value - see "Seed calibration direct input".

Seed calibration direct input

If a seed, fertiliser or liquid fertiliser is repetitively used, only the first calibration must be performed, whereby the calibration factor and the associated rotor should be recorded.

When using the same seed, fertiliser or liquid fertiliser again, the value can be entered directly.



Direct entry of the calibration value should only be used for absolutely identical seeds or fertilisers. The same rotor should also be installed, as otherwise a wrong quantity will be metered.

If the machine is equipped with a liquid fertiliser system, the calibration factor of approx. 600 pulses per litre must be entered here.

Due to the consistency differences in liquid fertilisers the value needs to be matched to the actual placement quantity.

For this purpose use the first measurable placement deviations from the nominal quantity to calculate the percentage and then change the calibration factor by the same percentage.

The deviation is displayed in the menu bar “performance data” (second work page with key “i”) in the calculated amount in litres to the actual required quantity.

If the displayed quantity is lower than the actual quantity metered then the calibration value must be reduced and vice versa.

Control factor

The control factor influences the control speed of the computer.

In case of speed changes the nominal placement quantity must be quickly reached again.

With a high control factor the computer tries to reach the nominal value in larger steps.

In this case the display changes rapidly with the corresponding deviations around the required figure.




A small control factor needs slightly longer to reach a required figure, but the deviations are much lower.

Based on experience made in the past the control factor should be set to 0.5.

Fertiliser reduction

In case of fertiliser reduction one can determine whether solid and liquid fertiliser quantities should be reduced by a set figure for tram lines.

Configuration 4.

		 100 m
	KONFIGURATION 4	
	Impulse/100m : 9600	
	Drehzahl1/min. : 0 1/min Impulse/Umdr. : 2	
	Drehzahl2/min. : 0 1/min Impulse/Umdr. : 2	
	Gebläse min. : 0 1/min max. : 4500 1/min Impulse/Umdr. : 1	

This menu page is used to enter the data for speed, shaft monitoring and fan monitoring.

For the speed the pulses for the 100 m distance must be entered.

The entry serves as a calculation information for speed display, area calculation and to control the seed and fertiliser quantity.

The number of pulses can be entered directly (approx. 9700).

For an exact input a 100 m distance must be travelled during initial installation and for later checks.

Travelling the 100 m distance




Switch over to the calibration program.

Press the “traffic light button” to start calibration.

	KALIBRIERUNG	
	1. Starten : 	
		

Another menu screen will appear. Start driving with the tractor.

	KALIBRIERUNG	
	2. Fahren 100m	
	3. Stoppen : OK oder abbrechen: ESC	OK
		ESC
	Anzahl Impulse : 17	

The pulses will be counted and displayed. Stop at the 100 m mark. Confirm the pulses (approx. 9700) with the “OK”-key. The value will be saved and used for all calculations.

Shaft monitoring

The system is able to display and monitor the speeds of two shafts.

For this purpose enter the desired minimum speeds for both shafts with the + and - keys. Enter the number of pulses per revolution for both shafts.

If the minimum speed is fallen short of an audible and visible alarm will be emitted.

Fan monitoring

For fan monitoring the maximum speed can be entered along with the minimum speed.

For the fan, the number of pulses per revolution (2) must also be entered.

When the limit values are exceeded or fallen short of an audible and visible alarm will be emitted.

Tram line rhythm



Overview and selection of tram line rhythm.

RHYTHMUS				
R-Nr	Länge	links	rechts	
4s	4	2	2	
999	0	0	0	0

The “R-No” only represents the number from the table and has no relevance for the rhythm.

The “Length” shows the number of bouts until the rhythm repeats itself.

The fields “left” or “right” show the bout numbers in which the seed hoses are closed.

The rhythm is determined by the width of the drill and the working width of the sprayer or fertiliser spreader.

The rhythm for the corresponding combination can be taken from the charts.

After selecting the rhythm number from the table the rhythm is displayed in the first line.

The second line with R-No. 999 can be used to enter a freely programmable rhythm.

Selecting a rhythm

- Column A: Working width of drill
- Column B: Working width of sprayer
- Column C: Overview of the individual drill and spraying bouts
- Column D: Rhythm input in computer
- Column E: Installation position of valves on machine

Choose drill working width (A) and spraying width (B) from the drawings. Column (C) shows the individual drill and spraying bouts with the bout numbers for the tram line.

Column (D) shows the rhythm number and (E) the installation position of the valves.

The rhythm numbers are stored in the computer table for selection.

For this purpose highlight the first line with the + and - keys and press "Return".

The rhythm table is displayed.

	27	18	12	7	16	3
	28	14	13	2	9	6
	29	14	9	6	13	2
	30	30	27	4	19	12
	31	30	19	12	27	4
	54	10		3		8
	55	10		8		3
	60	6		2		5
	61	6		5		2
	2s	2		1		1
	4s	4		2		2
	6s	6		3		3

Use the + / - keys to select the rhythm number and press "Return" to confirm.

The number is accepted and displayed in the first line.

Free rhythm input

	8s	8		4		4
	10s	10		5		5
	12s	12		6		6
	114	14	10	5	12	3
	118	18	15	4	13	6
	999					

Selection 999 from the computer table activates the programmable rhythm.

Length of rhythm and bout number must be entered into the second line.

	RHYTHMUS					
	R-Nr	Länge	links	rechts		
	999					
	999	4	2	3	0	0



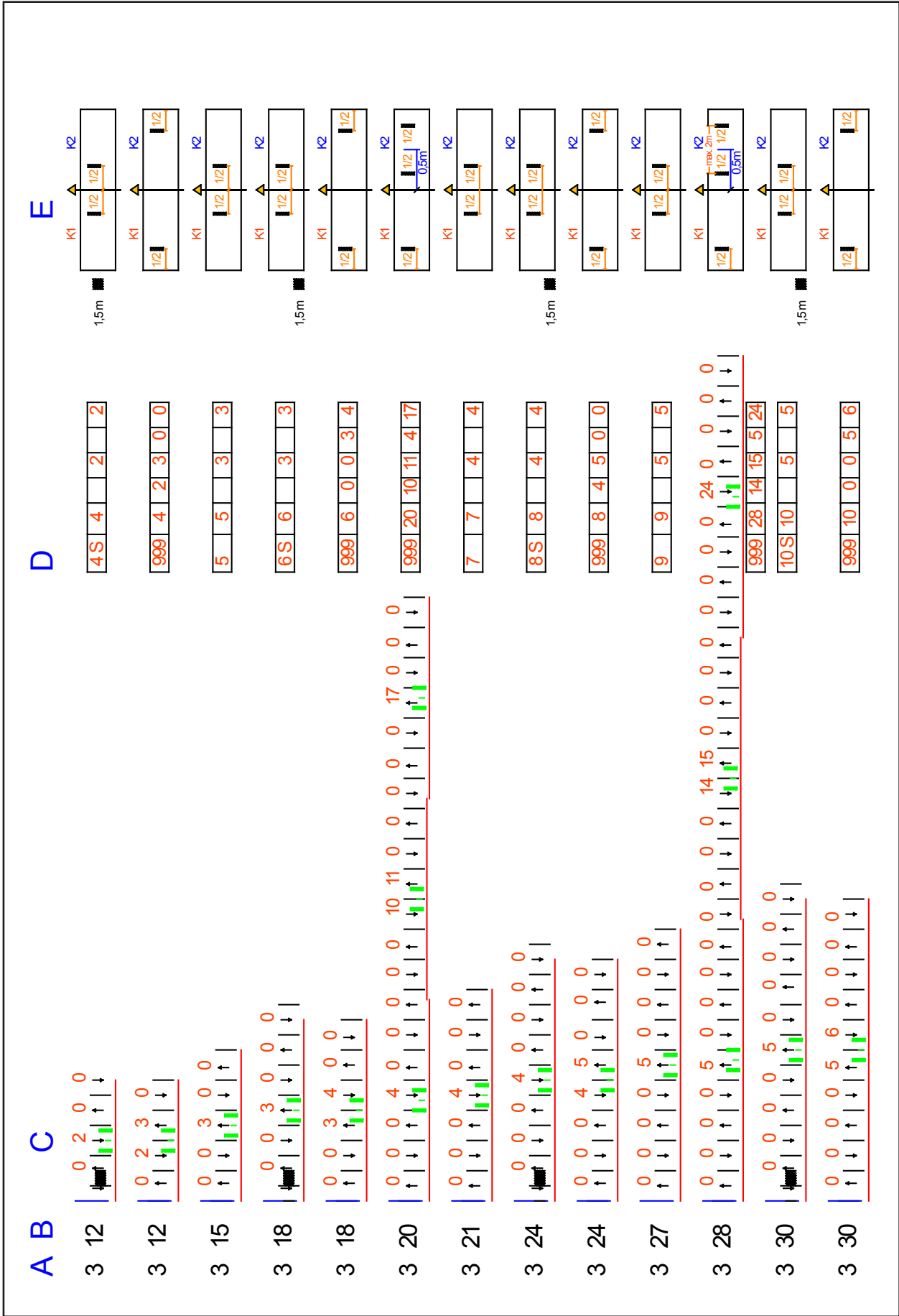
All rhythm numbers are specified for starting work from the left hand headland of a field.

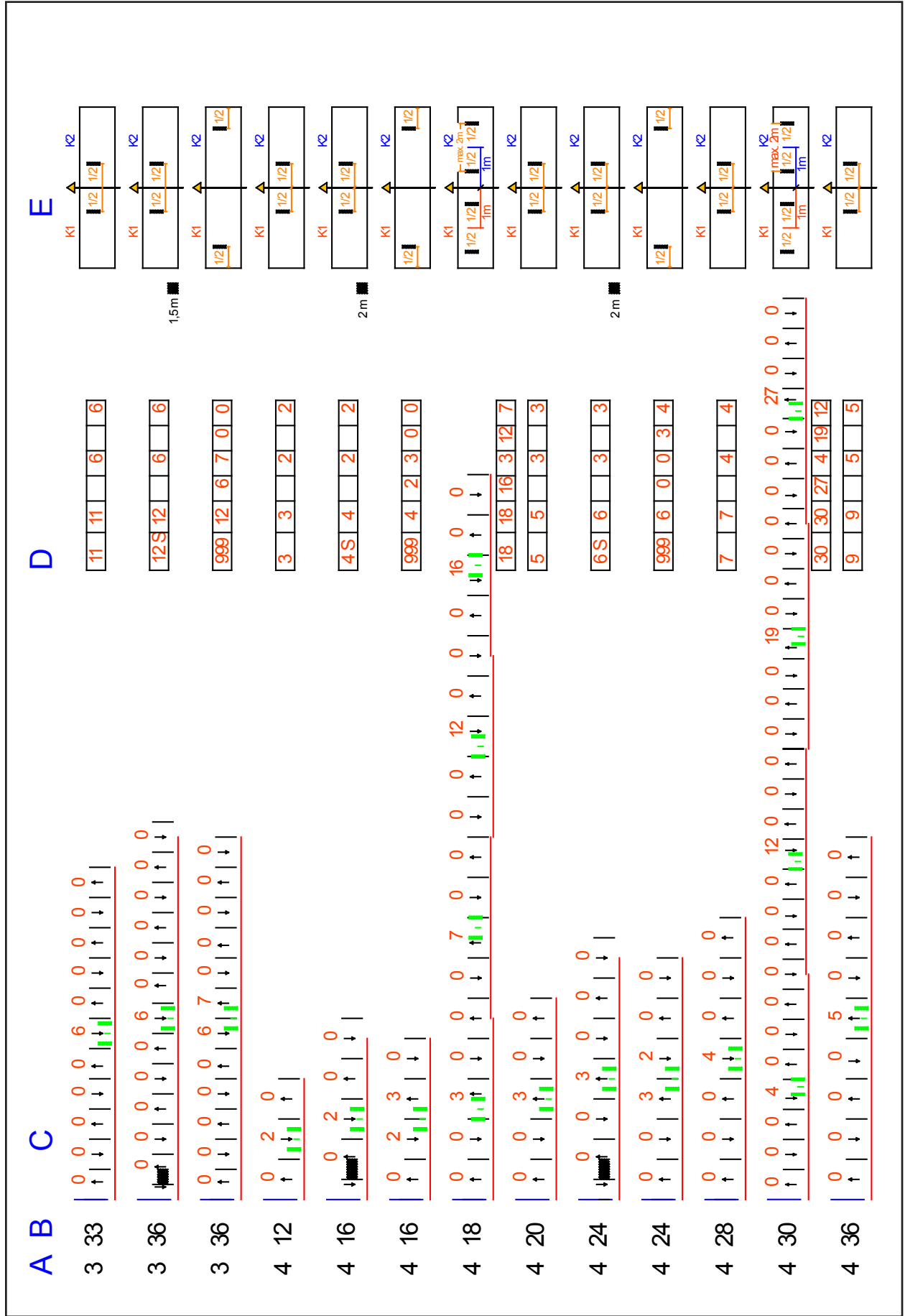
When starting work from the right hand headland of a field the numbers must be changed accordingly.

With some working widths one can select from over drilling with halve the working width and place the 2 tramlines on two different working bouts.

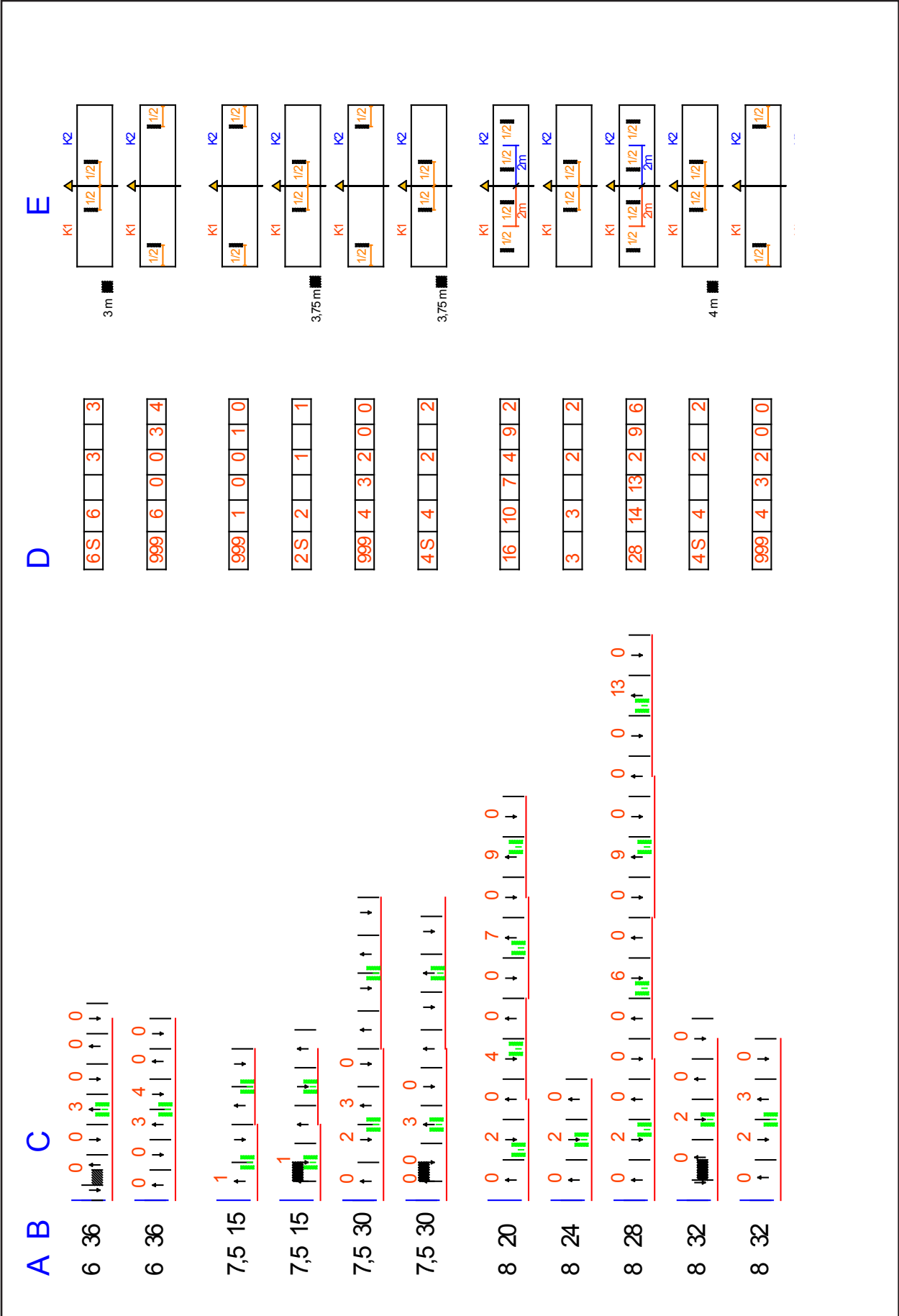
The sections that had been over drilled are marked.

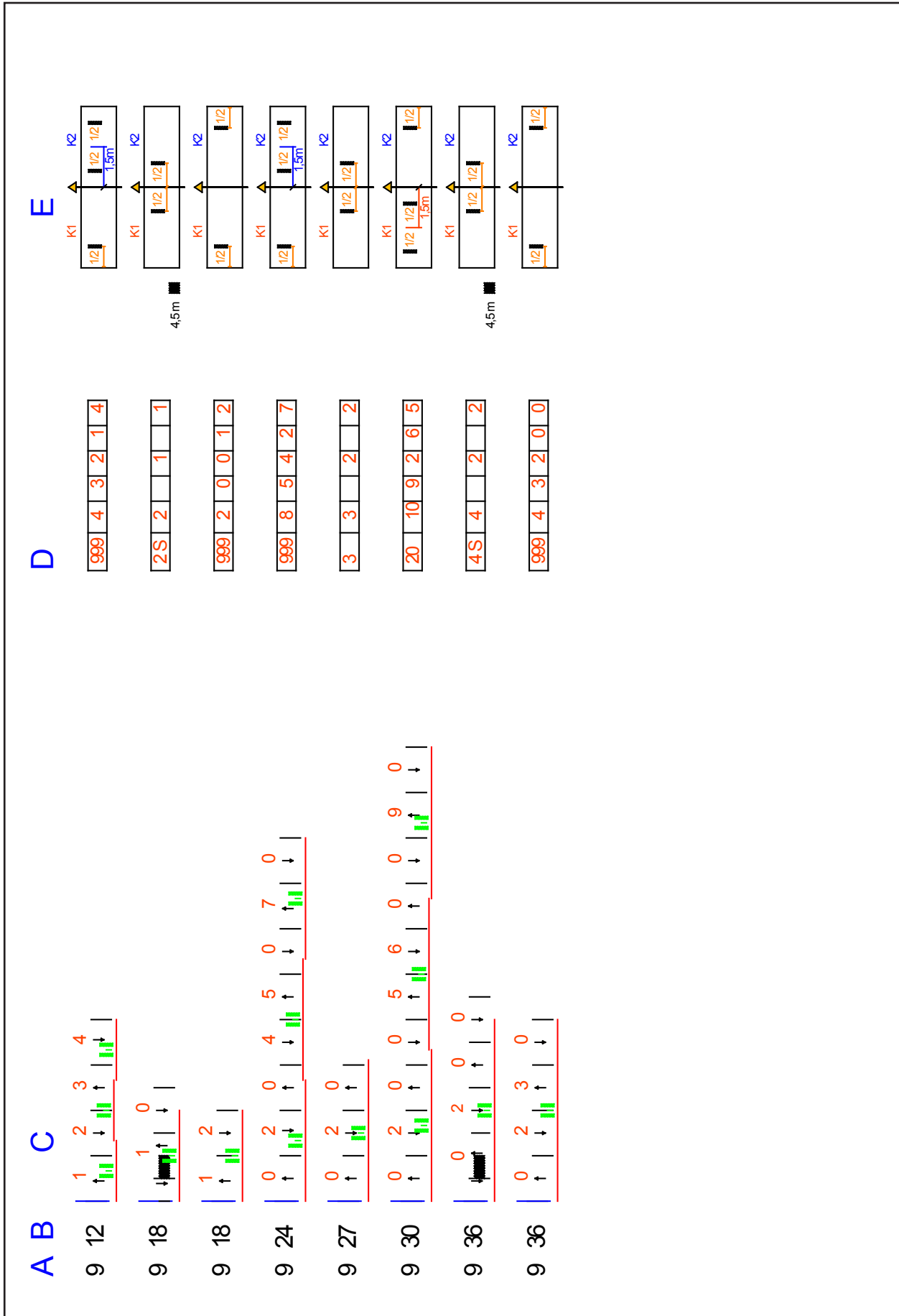
The selection depends on the installation position of the tramline valves on the machine.

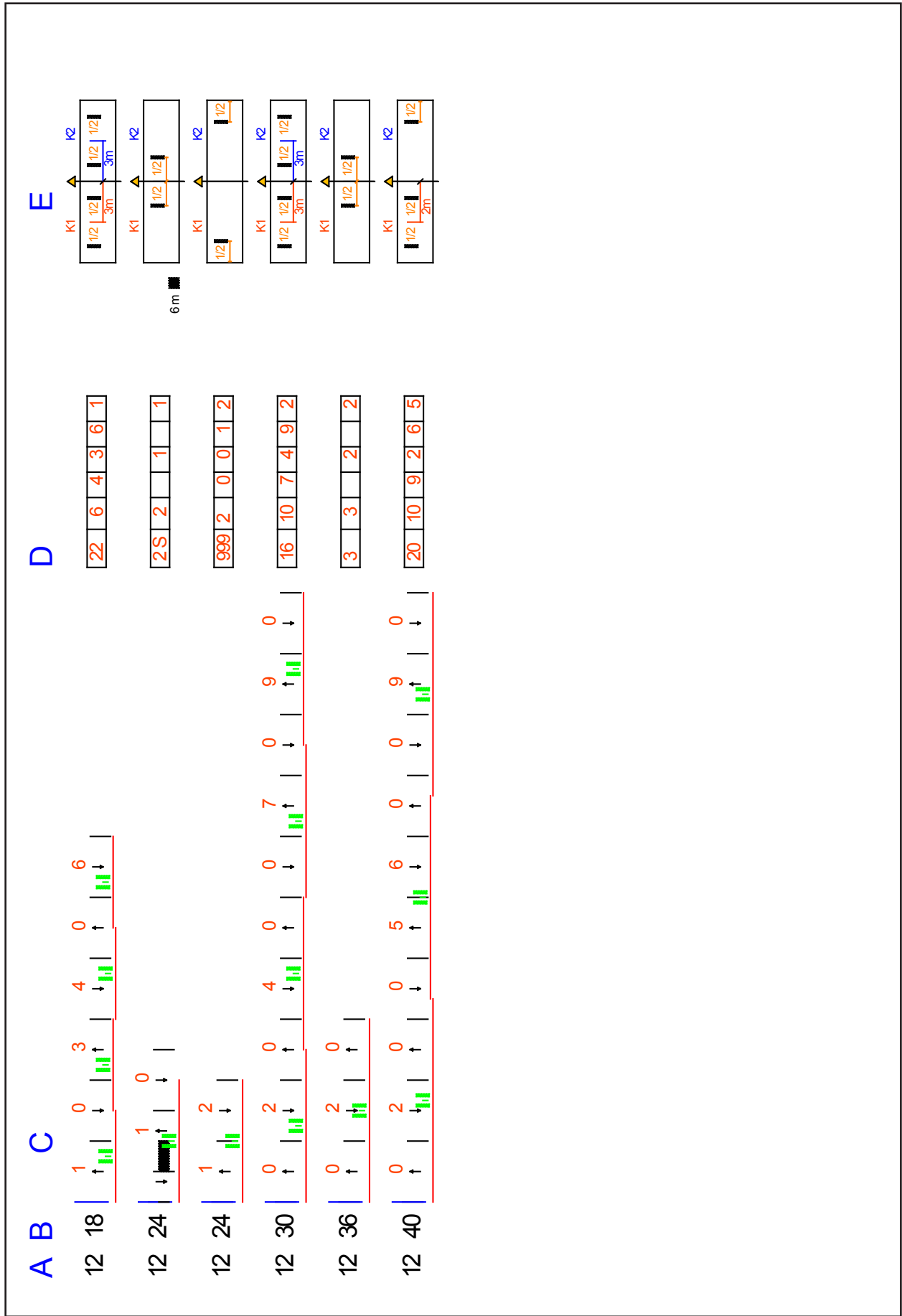




A	B	C	D	E
6	12	1 0 ↑ ↓ ↑ ↓	2 S 2 1 1	3,0m K1 1/2 1/2 K2
6	12	1 2 ↑ ↓ ↑ ↓	999 2 0 0 1 2	K1 1/2 K2
6	15	0 2 0 4 0 0 7 0 9 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	16 10 7 4 9 2	K1 1/2 1,5m 1/2 1/2 K2
6	18	0 2 0 ↑ ↓ ↑ ↓	3 3 2 2	K1 1/2 K2
6	20	0 2 0 0 5 6 0 0 9 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	20 10 9 2 6 5	K1 1/2 1m K2
6	21	0 2 0 0 0 6 0 0 9 0 0 13 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	28 14 13 2 9 6	K1 1/2 1,5m 1/2 1/2 K2
6	24	0 2 0 0 ↑ ↓ ↑ ↓	4 S 4 2 2	K1 1/2 K2
6	24	0 2 3 0 ↑ ↓ ↑ ↓ ↑ ↓	999 4 2 3 0 0	K1 1/2 K2
6	27	0 0 3 0 0 0 7 0 0 0 12 0 0 16 0 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	26 18 16 3 12 7	K1 1/2 1,5m 1/2 1/2 K2
6	28	0 0 3 0 0 0 7 8 0 0 12 0 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	999 14 3 12 7 8	K1 1/2 1m K2
6	30	0 0 3 0 0 ↑ ↓ ↑ ↓ ↑ ↓	5 5 3 3	K1 1/2 K2
6	32	0 0 3 0 0 0 8 9 0 0 14 0 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	24 16 9 8 14 3	K1 1/2 1m K2
6	33	0 0 3 0 0 0 9 0 0 14 0 0 20 0 0 ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓	999 22 14 9 3 20	K1 1/2 1,5m 1/2 1/2 K2







Seed flow monitoring

The system consists of a seed flow module, the sensors in the seed lines and the wiring. The monitoring system may also be installed later.

The module is connected to the Y-cable of the computer. Up to 60 sensors can be installed in the seed lines.

The software for seed flow monitoring is pre-installed and should be of version 4.13 or higher for diagnostics.

The seed flow monitoring system generates an alarm in case of blocked seed hoses and (depending on the sensitivity setting and the type of seed) also in case of changes in quantity.

Before start-up the seed flow system must be switched on in the machine configuration.

The numbers of the seed flow sensors installed in the hoses with tram line valves must be entered into the menu for tram line rhythms.

Monitoring becomes active as soon as the sensitivity is set higher than "0".

Entering sensor numbers for FGS

If the seed hoses of the tram line tracks are equipped with seed flow sensors, the row number must be entered in the computer to avoid false alarms when the tram line is switched on.

RHYTHMUS					
R-Nr	Länge	links		rechts	
999					
999	4	2	3	0	0
Nr. der Saatflusssensoren					
FG links :		12	13	14	0
FG rechts:		23	24	25	0

The input possibility for this appears as soon as the seed flow monitoring in the machine configuration is switched on.

Use the + / - keys to select the tram line left and the tram line right and enter the numbers of the seed flow sensors.

Four seed flow sensors, which are not to be monitored when the tram line is switched on, can be entered for each bout.

If (with a tram line switched on) seed drops through the hose because of a defective or non closed valve, then the sensor will detect this and report it as a fault "Seed flow in xx".

Setting the sensitivity

On the third page the sensitivity can be set with the + and - keys (1) in 10 steps.

The setting depends on grain size, type and quantity of seed.

Setting

The setting must be made during drilling and at normal working speed.

The sensitivity is thereby matched to the seed quantity. Deviations are indicated by means of an alarm.

During sowing regulate the sensitivity (2) up with the + key (1), until the first sensors are reported blocked.

	4s		①
	Sollwert: 150.0 kg/ha		
	Sollwert: 200.0 kg/ha		
	Tank1 : leer		
	Tank2 : leer		
	Drehzahl1 : 0 1/min		
	Drehzahl2 : 0 1/min		
	Empfindl. : 1 ②		
	2 Sensor(en) geblockt!		
	2 3 0 0 0 0		

Then reduce the sensitivity, until no blockage is reported.

Normally 1 to 2 stages are sufficient. The further you regulate down, the more quantity deviations will be accepted, until the alarm responds.

Seed flow monitoring

Seed flow monitoring is switched on as soon as the sensitivity is set to 1 or higher.

The display of the first work page shows the seed flow monitoring with the symbol (3).

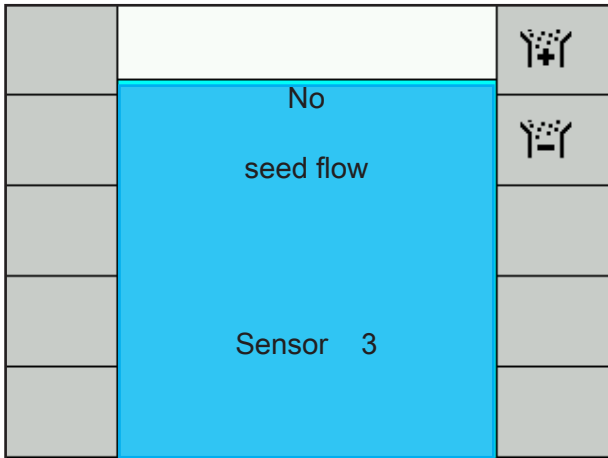
STOP		100%
-	6.0 km/h 800 1/min	+%
+	100% ③	-%
	42 160.0 1/min 0.0A kg/ha	
	36 200.0 1/min 1.6A kg/ha	

During sowing the symbol is permanently visible. If the work signal fails, e.g. when turning and no grains are blown through, the symbol will flash.

On the third page all sensors will then be reported as blocked.

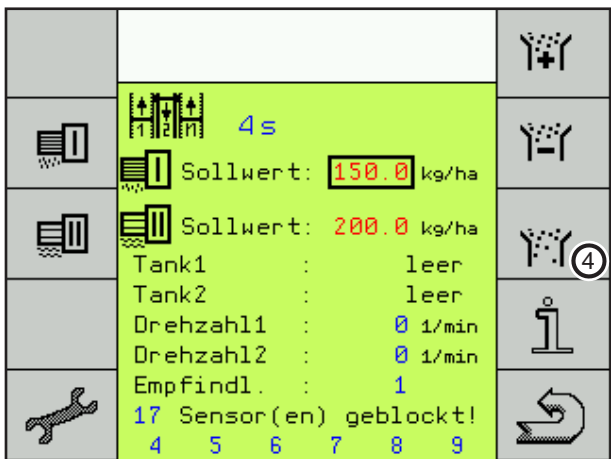
Alarm message

In case of blockage or quantity deviations the message “No seed flow at sensor XX” will be displayed.



If several hoses are blocked only the first number of the clogged hoses will be indicated in the alarm.

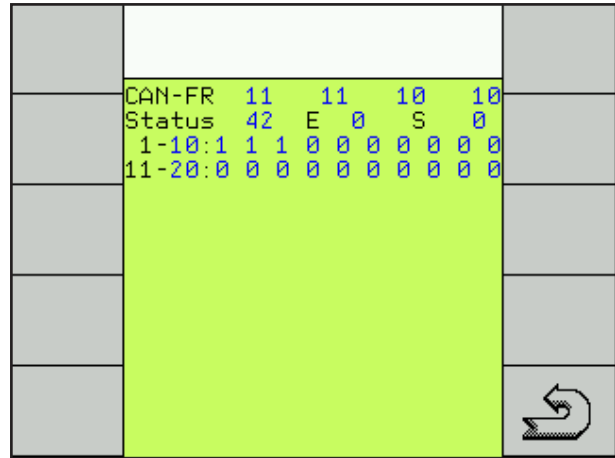
The other numbers of clogged hoses are displayed on the third work page.



Key (4) can be used to switch into the seed flow system for trouble shooting.

Seed flow diagnostic

The seed flow diagnostic indicates the blocked sensors, but also defective sensors or broken cables.



In the first line the “CAN-Frames” and in the second line the status is counted. As long as these continue to count the monitoring is functioning.

At “E” the type of fault is displayed, a cable breakage with “1” and any other fault with “9”. At “S” the last functioning sensor is indicated. The fault or broken cable must be located after this sensor.

The bottom section shows the operating status of each sensor. The figure 1 represents each sensor without fault. Blocked sensors are indicated with “0”.

After correcting a fault it will take up to 1 minute until the current operating status is displayed again.

Diagnostics program



In the diagnostics program the input and output signals can be tested.

①			
②		DIAGNOSE 1	
③		Gebläseimpulse : 29	
		Saatmotorimpulse : 0	
		Radarimpulse : 29	
		Arbeitsstellung : 0	
		Abdrehschalter : 0	⑥
④		Stromaufnahme : 89	
		Füllstand Tank1 : 0	
		Füllstand Tank2 : 0	
⑤		Fahrgasse links : EIN	⑦
		Fahrgasse rechts :	

1. Key for seed metering motor:

The seed metering motor runs until the key is pressed again. The display shows and successively counts the seed motor pulses.

2. Key tram line left ON:

The valves for the left hand tram line must close and the display changes the left tram line indication to "ON".

3. Key tram line left OFF:

The valves for the left hand tram line must open and the display changes the left tram line indication to "OFF".

4. Key tram line right ON:

The valves for the right hand tram line must close and the display changes the right tram line indication to "ON".

5. Key tram line right OFF:

The valves for the right hand tram line must open and the display changes the right tram line indication to "OFF".

6. Continue to next diagnostics page:

7. Return to the machine data selection.

Fan pulses:

When the fan is running the pulses are continuously counted.

Radar pulses:

During travel the radar pulses are successively counted.

Work position:

Here the work signal of the hydraulic pressure switch can be checked. With the machine lowered "0" must be indicated, in lifted condition the display changes to 1.

Calibration switch:

Normal indication "0", when turning off the display changes to 1.

Power consumption:

Shows the present current consumption.

Filling level hopper 1 (seed hopper)

Indicates the switching condition of the hopper sensors. With an empty hopper the display changes from 0 to 1.

With several hoppers the system does not indicate which sensor has switched.

Filling level hopper 2 (bridging)

Indicates the switching condition of the sensors in the metering unit. The sensors monitor bridging in the seed hopper and warn in case of an empty metering unit.

With an empty metering unit the display changes from 0 to 1.

With several metering units the system does not indicate which sensor has switched.



Use the arrow key (6) to switch to the second diagnostics page.

The second page in the diagnostics system is displayed.

Here one can check the functions of the metering drive for the fertiliser hopper, the hydraulic bout marker control with lifting hydraulics and the extension for the folding hydraulics as well as the half width control and the pre emergence markers.

The hydraulic functions (2 - 5) are shown at the bottom of the display when current is switched on.

①		⑥
②	DIAGNOSE 2	⑦
③	Düngermotorimp. : 0	⑧
④	Durchfl.-Impulse: 0	⑨
⑤	Halbseite links : 616	⑩
	Halbseite Mitte : 0	
	Halbseite rechts: 615	
	Stromaufnahme : 141	
	Drehzahl1 : 0	
	Drehzahl2 : 0	

1. Key for fertiliser metering motor:

The fertiliser metering motor runs until the key is pressed again. The display shows and successively counts the fertiliser motor pulses.

2. Bout marker left:

The key switches current to the hydraulic valve for left hand bout marker.

3. Bout marker right:

The key switches current to the hydraulic valve for right hand bout marker.

4. Lift machine:

The key switches current to both solenoid valves for the lifting hydraulics.

5. Folding the machine:

The key switches current to both solenoid valves for the machine's folding hydraulics.

6. Key for half width control right:

The servo motor moves as long as the key is held depressed or until the next limit switch is reached.

7. Key for half width control left:

The servo motor moves as long as the key is held depressed or until the next limit switch is reached.



8. Key for pre emergence markers:

When pressing the key current is applied to both channels.

9. Arrow keys to third page "Diagnostics".

10. Return to work page.

With the arrow key (9) you open the page „Diagnostics 3“. Here the total performance of the machine is displayed.

	DIAGNOSE 3	
	 Gesamt-Menge : 122473 kg Gesamt-Fläche : 1386 ha Gesamt-Strecke : 2311 km Gesamt-Zeit : 187 h	
	 Gesamt-Menge : 78 kg	➡
	Betriebstunden: 444 h mxh-Version: 4.14 iop-Version: 1.07	↻

These data cannot be deleted!

The key (10) can be used to select machine data.

The mxh-version shows the software status in the computer, e.g. 4.14.