HORSCH®

Specialists in modern cultivation and seeding technology

05/2005

HORSCH DrillManager V 24

Operating Instructions

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

Art.: 80110204 en

Please detach and send to HORSCH Maschinen GmbH or give to the service technician when receiving instruction

Machine Registration

No warranty claims will be accepted if this machine registration form is not returned !

To
HORSCH Maschinen GmbH
Postfach 10 38
D-92401 Schwandorf

Type of machine: .....
Serial number: .....
Delivery date: .....

Additional equipment: .....
.....
.....

Operating instructions: 5/2005

80110204 DrillManager AG V 24 en

I hereby confirm receipt of the operating instructions and spare parts list for the above mentioned machine.

I have been instructed by a HORSCH service technician or authorised dealer in the operation and functions of the machine, as well as in the safety requirements.

.....
Name of the service technician

Dealer
Name: .....
Street: .....
Postal code: .....
Place: .....
Tel.: .....
Fax:.....
E-mail: .....
Customer No. : .....

Customer
Name: .....
Street: .....
Postal code: .....
Place: .....
Tel.: .....
Fax:.....
E-mail: .....
Customer No. : .....

I am aware that a warranty claim will only be valid if this form has been fully completed, signed and returned to HORSCH Maschinen GmbH, or has been given to the Service Technician, immediately after first instruction.

.....
Place, date of first instruction

.....
Buyer's signature

Machine identification

Enter the relevant data in the following list upon delivery of the machine:

Serial number: .....
Type of machine: .....
Year of construction: .....
First operation: .....
Additional equipment: .....
.....
.....
.....

Components (DrillManager):

1 SWITCHBOX	☐
... VALVES	☐
... SHAFTS	☐
... BINS	☐
... FAN	☐
1 SPEED SENSOR	☐
1 WORK SENSOR	☐
... FLOW ... SEN	☐
1 ELECTRIC DRIVE (EMD)	☐
1 ATS SYSTEM	☐
1 LIQUID FERTILISER MODULE	☐
1 FLOW METER	☐
1 HALF-SIDE CONTROL MODULE	☐
1 GPS MODULE	☐

Date of issue of operating instructions 5/2005

Dealer's Address :

Name: .....
Street: .....
Place: .....
Tel.: .....

Cust. No.: Dealer: .....

HORSCH address:

HORSCH Maschinen GmbH
92421 Schwandorf, Sitzenhof 1
92401 Schwandorf, Postfach 1038

Tel.: 09431/7143-0
Fax: 09431/41364
E-Mail: info@horsch.com

Cust. No.: HORSCH: .....

Table of contents

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.
For example for

- operation and transport (including preparation, remedying of faults in the operating sequence and 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 drills and their components and to apply liquid fertiliser.

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

Warranty guidelines

1. As of 01.01.2002, the period of liability for material defects (warranty) in our products is 24 months. In the case of written deviations from the statutory provisions, these agreements shall apply.
   They become effective upon delivery of the machine to the customer. All wear parts are excluded from the warranty.

2. Warranty claims must be submitted to the HORSCH Customer Service Department in Schwandorf via your dealer. It is only possible to process claims which have been correctly completed and submitted no later than four weeks after the damage occurred.

3. In the case of deliveries made under the warranty which are subject to the return of the old parts (GV), the warranty claim, together with the old parts, must be returned to HORSCH within 4 weeks after the damage occurred.

4. In the case of deliveries made under the warranty which are not subject to the return of the old parts (GO), these parts must be kept for the purpose of further decisions for a period of four weeks after receipt of the warranty claim.

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

DrillManager

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

It regulates, monitors and controls all the connected modules.

The DrillManager should only be used after you have read the operating instructions and familiarised yourself with its operation.

The applicable accident prevention regulations and the other generally accepted rules in respect of safety and occupational medicine are to be complied with.

Description

Modular design

The HORSCH DrillManager is of modular design. The individual modules are connected individually to the computer.

Two different LCD boxes are available for the different languages.

Version A: German
English
French
Czech

Version B: Hungarian
Danish
Polish
Spanish

The machine can be adapted to the individual needs of the customer. An overview of the components and connection layout is to be found in the assembly diagram.

The fully-equipped HORSCH DrillManager comprises the following components:

- Computer with LCD display and operating panel
- Switchbox
- Modules for: Three metering drives
  Tramline control system
  Hydraulic valve block
  Liquid fertiliser control system
  GPS control system
  1/2 width shut off
- Sensors: Driving speed (radar)
  Work signal
  Fan speed
  Low-level indicator

Computer

The computer communicates with the individual modules and sensors via a “bus” system. It evaluates the information received.

The current values can be individually displayed on the monitor by pressing the appropriate button on the LCD panel.

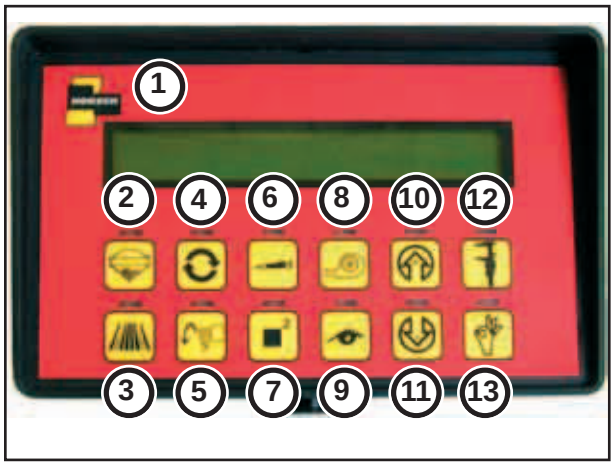
The data is shown time-delayed on the display so that the display does not “jump” and remains readable.
Technically, changes are immediately made at all control units.

The seed and fertilising products are denoted by “P” for product and, in the case of several metering drives, by “P1”, “P2” and “P3”.
The application rate values are shown as “R” for rate and, in the case of several drives, as “R1”, “R2” and “R3”.

The computer continuously monitors 8 different operations simultaneously.
If the programmed or fixed setpoint values are exceeded or fallen short of, or in the case of faults, the monitor display is interrupted by a “Smart Alarm ™”.

The relevant component or the exceeded limit will be displayed.

“Smart Alarm ™” always indicates the most important alarm if several faults occur simultaneously.
The individual “Smart Alarm ™” functions are explained in the relevant chapters.



Computer

1. Monitor
2. Low-level indicator
3. Tramline mode
4. Metering Roller Speed Indicator
5. Variable Rate Mode
6. Operating Speed Mode
7. Area / Weight counter
8. Fan speed
9. Seed flow control system
10. + button (decrement)
11. - button (increment)
12. “Functions” button
13. “OK” button

To start the DrillManager, activate the main switch at the switchbox.

The computer stores all values programmed, and data acquired, during operation. These remain saved even after the system is switched off.

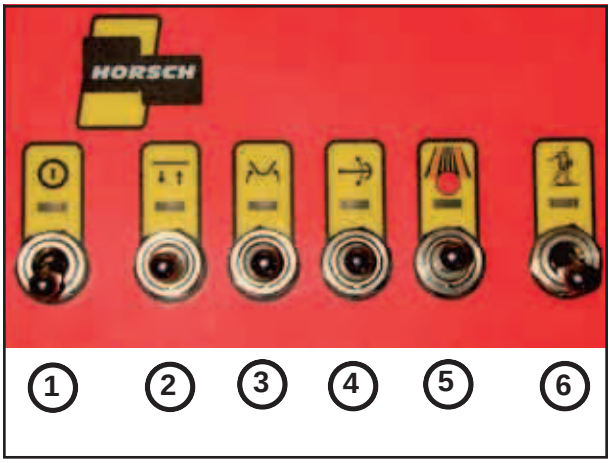
When switched on again, the system always returns to the tramline and seed rate mode.

Power input
On Vers. 20 and later versions it is possible to display the power input (amps) for the metering drive.
This can be useful for troubleshooting and enables damage to be detected early on as the power input is increased by the presence of foreign bodies or due to defective bearings.
The power input is normally around 10 amps depending upon the seed type and quantity.
An alarm signal is displayed when the power input exceeds approx. 14 amps and the system shuts down altogether when it exceeds approx. 20 amps.
To measure the current, switch to the “variable rate mode” display and press the “+ and -” buttons together.

Switchbox

The manual modes are controlled and the system switched on via the switchbox.

Immediately a mode has been switched on, the corresponding light will appear.



Switchbox

1.	Main switch	On - Off
2.	Hydraulic function	Lift - Lower
3.	Hydraulic function	Fold
4.	Hydraulic function	Bout marker
5.	Tramline switch or 1/2 width shut-of control	Set/Override pass left/right
6.	Drill	On/Off

1. Main On/Off switch
The entire system is started via this toggle switch. All components are supplied with power. The computer can communicate with the individual components.

2 - 4. Control switches for hydr. functions
Three different hydraulic functions (lift, fold and bout marker) can be preselected for the drill using this switch.

Activate hydraulic functions:
Push the switch up until the indicator light flashes.
The preselected modes are run by activating a spool valve on the tractor.

Deactivate hydraulic functions:
Push the switch down until the indicator light extinguishes.

5a. Tramline mode
Here, the current tramline pass can be set or changed.

When the toggle switch is pressed down, the pass you are on is decreased by one. When the switch is pushed up, the pass number is increased.
The tramline can also be adjusted in the raised position during seeding.

The displayed track can be put in to override by pressing the switch. Push the switch up, until the indicator light flashes.
If the switch is pushed down until the light extinguishes, the pass is no longer in override mode.
The tramline can be locked both in the raised position and during seeding.

5b. 1/2 width shut-off mode:
If the drill is designed for 1/2 width shut off, the switch is used for this purpose.
The tramline control system is then deactivated.

The seed flow control is automatically reduced when one-side operation is engaged.
“Tramline mode” can still be selected.

Press the button up or down to enable the 1/2 width shut-off mode. An electric linear motor then adjusts a flap in the Venturi pipe and closes the outlet.
The indicator light flashes and the warning sound is activated when the flap is in its final position.

☞ The seed rate flashes on the display when in 1/2 width shut off mode. The seed quantity/ha is not altered. Only the speed of the metering unit is halved.

The shut-off side is not indicated. Operators must check for themselves if they are unsure which side has been shut off.

Operate the switch on the switchbox to disable 1/2 width shut-off mode again. The positioning motor moves back and the indicator light on the switch is extinguished at the centre position.

After using the 1/2 width shut-off and repositioning at the central position, the position of the flap in the Venturi pipe should be checked.
If the flap or the motor does not stop precisely in the middle, the seed will be sown with non-uniform distribution.

Monitoring the flap position with reference pointer.
The signal for the centre position is transmitted to the motor.
In this position, the flap must be in the centre as a result of the linkage setting.
At the central position, the reference pointer (retrofitted) must be precisely on the marking. Adjust the linkage if necessary.

Monitoring the flap position with sensor.
In the version with the sensor, the centre position of the flap is controlled via the sensor signal.
When the flap is in the centre, the lamp on the sensor illuminates. The left and right end positions of the flap are not monitored and must be harmonized with the limit switches in the motor via the linkage.

6. Drill ON/OFF
This toggle switch turns the seed mode on or off. If the switch is in the “On” position, sowing can begin.

Immediately a mode has been switched on, a light will appear above the symbol.

Smart Alarm ™

The Smart Alarm monitors all components and setpoint values.

If the setpoint values are exceeded or fallen short of, the computer actuates an alarm irrespective of which mode is switched on.
The incorrect value appears on the display and an alarm sounds.

E. g. , speed too high:

SPEED TOO HIGH

This alarm can be acknowledged via the “OK” button. The display jumps back to the previous mode.

The alarm switches off automatically if the driver can remedy the cause of the alarm indication, e.g., can get the fan speed, speed and the incorrect operation conditions to within the setpoint range again.

If the incorrect values remain outside the setpoint values, the alarm indication will again appear every 10 seconds.

The alarm must be acknowledged each time until the cause has been remedied.

The alarm with respect to an empty bin will only be repeated once. The low-level indicator will only be activated again after the bin has been filled.

Modules

The following modules can be installed in the drill control system:

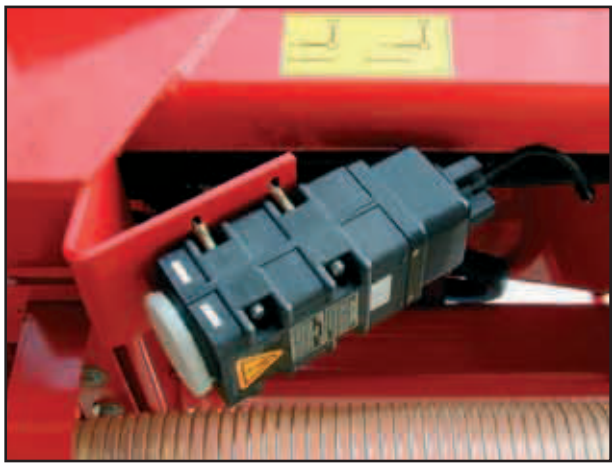
Modules

1. Electric motor drive module (seed metering drive) - metering unit
2. ATS system module (tramline mode) - magnetic valves
3. Hydraulic valve module (hydraulic functions) - hydraulic valve block
4. Seed flow system module (seed flow control) - seed flow sensors
5. Liquid fertiliser module (fertiliser flow control) - flow sensor
6. GPS module
7. 1/2-width shut-off module
8. 6-channel module (filter module to prevent faults as a result of electrostatic charging).

Each module has an input and output connection by means of which they can be connected in series and to the LCD display.

Sensors

The following sensors can be installed in the drill:



Sensor - radar

1. Radar sensor
2. Metering drive speed sensor - (integrated in electric motor)
3. Working position sensor - (pressure sensor in lift/lower hydraulic circuit)
4. Fan speed sensor - (inductive sensor in fan housing)
5. Low-level sensor - (seed hopper)
6. Flow sensor - (liquid fertiliser)
7. Seed flow sensors - (in seed pipes from the distribution head)

☞ The sensors are plugged into input “A” and/or “B” of the module.

Operation

Low-level indication

This system monitors up to five low-level sensors. In this mode, the number and control state of the individual low-level sensors are shown.

BIN 1 2
(flashes)

In this example, two low-level sensors are installed. If the number is not flashing, the hopper is adequately filled. If a number is flashing, the level in the hopper below that sensor has dropped.

Smart Alarm ™
When a bin is empty, the computer activates an alarm irrespective of which mode is switched on.
The following messages will appear alternating and an alarm will be audible.

BIN 2 LOW

PRESS KEY TO ACK.

This alarm can be acknowledged via any of the computer buttons.
The computer then returns to the monitoring mode chosen.

The alarm is triggered again after a brief period. If it is confirmed, the alarm is cancelled and is not enabled until the next filling.

Tramline mode

If tramline mode is installed, the status of your tramline rhythm will be monitored with this function.

☞ Recommended display when sowing!

Display in the case of an electronic metering drive:

PASS 3 P1 150

PASS 3:
The 3rd pass of the selected tramline rhythm is being sown.

P1 150:
Actual seed rate 150 kg/ha at “metering unit 1”.

If several metering units or a liquid fertiliser system are connected, the display changes constantly and shows all the rates one after the other.

P2 212:
Actual fertilising rate 212 l/ha at “metering unit 2” (liquid fertiliser).

PASS 3 P2 212

Tramline mode:
The tramline rhythm must be programmed prior to beginning sowing.

If none has been programmed, “NO RHYTHM” will appear on the monitor.

How to program the tramline rhythm is described under “tramline rhythm mode”.

When the drill is being lifted, a signal is transmitted to the computer via a pressure switch in the hydraulic circuit.

This switches the tramline rhythm on one pass further in each case. Once the tramline mode has reached the last pass number programmed, it automatically begins again from Pass 1.

The signal is relayed with a time delay of approx. 2 seconds to prevent false readings as a result of pressure peaks in the hydraulic system.

☞ If the number of the pass indicator is flashing, the tramline valves have been activated!

Automatic seed rate reduction:
The automatic seed rate reduction system of the DrillManager acts as a seed return system.

In the case of one tramline, the magnetic valves are closed and the computer reduces the seed rate according to the number of magnetic valves.

Correcting the tramline pass number:
If the drill is lifted during sowing (e.g., when sowing around an obstacle), the tramline mode has automatically counted on one pass.

The pass number can also be corrected on the computer using the scroll buttons or the switch No. 3 “setting tramlines”.

The tramline can always be changed using the scroll buttons, using the switch only in operating position and if no 1/2 side shut-off control is installed.

Setting the tramline pass number:
For applications in which the tramline pass number displayed should not be automatically counted on, it can be prevented from doing so.

Push the switch No. 3 up until the indicator light flashes.
To switch off, press the switch down until the lamp extinguishes.

Metering unit / motor speed

This mode shows the speed of up to 5 different metering units or shafts.

MOTOR 1	50.8

MOTOR 1:
Speed of the motor on “metering unit 1”

50.8:
Actual revolutions: 50.8 rpm.

Only the speed of one shaft or metering unit is shown at a time.
Using the scroll buttons or the button the display of the required shaft or metering unit can be selected.

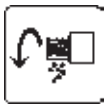
Shaft 1	40

SHAFT 1:
Speed of shaft 1
40:
Actual revolutions: 40 rpm

One minimum speed value only can be programmed for all speeds.
If this value is fallen short of by at one sensor, the computer activates the alarm.
For the entry of the minimum speed value refer to chapter “Entry SHAFT LOW”.

“Smart Alarm ™”
The “Smart Alarm” becomes active only after the machine has been in operation for 5 seconds.
Therefore, in the booting phase, the components monitored can attain operating status without tripping a false alarm.

Metering quantity



This mode shows the pre-selected rate and the actual seed rate.

Seed rates of less than 50 kg/ha are automatically shown with one decimal place.

Up to 4 different application rates can be monitored and displayed one after another.

P1	150	KG/HA	148

P1:
Application rate at the metering unit “1”

150:
Pre-selected seed rate: 150 kg/ha

KG/HA:
Rate value in kg/ha

148:
Actual seed rate: 148 kg/ha.
The value fluctuates slightly in the region of the setpoint value.

The display always shows only one application rate. In the case of several application rates (e.g., P1, P2, P3) these can be displayed one after the other via the “variable rate” button.

If the drill is stopped or lifted, the metering drive is stopped.

When the drill is lowered or switched on, the actual seed rate returns to the programmed value again after a short time.

Adjust metering quantity

The programmed application rates can be adjusted during sowing via the fold wings switch or the “SCROLL BUTTONS”.

Adjustment via the fold wings switch:
The seed rate can be adjusted in % increments during sowing via the switch in the switchbox.
The % increment is entered in the first setting level in the menu item “Delta Step”.
The metering quantity is reset at all metering units and the liquid fertiliser.

Each time the switch is actuated, the rate changes by the % value.
The LED in the pushbutton switch flashes as long as the setpoint value has been adjusted.

If the fold switch is actuated in the opposite direction to the adjustment, resetting to the programmed value can be effected step-by-step.

In mode display “VARIABLE RATE”, the programmed value (100%) can also be reset via one of the two scroll buttons by pressing the button once.

☞ In doing so, only the quantity indicated is reset.

If several metering units are installed, each metering unit must be selected and reset to 100% via a scroll button.

When the programmed value has been reset, the LED stops flashing.

Adjustment via the “SCROLL BUTTONS”
In the mode display “VARIABLE RATE” any application rate (P1 - P4) shown on the display can be adjusted.
Set the desired new rate using the two scroll buttons. The new value will automatically apply.
The setpoint value can be adjusted either with the machine at a standstill or during sowing.

Adjustment is effected in kg increments and, for less than 50 kg, in 1/10 kg increments. If the button is held down, the value initially jumps in 10 kg increments and then in 100 kg increments.

Liquid fertiliser control system:
The fertilising rate is shown as “P2” and shown in l/ha.

If no fertiliser is to be applied, the fertilising rate P2 must be set to 0 in the mode display “VARIABLE RATE” using the scroll buttons.

At the same time, the magnetic valve is shut off and the Smart Alarm for the liquid fertiliser is switched off.

Starting the metering roller manually (meter fill mode):
The metering unit can be started manually to sow field corners.
In this case the metering unit runs for approx. 15 seconds even without a speed signal.

Start the metering unit:
- Machine in operating position.
- Switch on fan.
- Switch on mode display “VARIABLE RATE”.
- Hold the “OK” button down for 5 seconds.
- The metering roller will rotate for 15 seconds at 15 rpm.

METER FILL . . . (flashes)

If you begin driving during this time, the computer registers the driving speed and controls the seed rate accordingly.
If you do not begin driving, the metering roller will stop after 15 seconds.

Forward speed

This mode shows the forward speed and the application rate. If several metering units are connected, these will be displayed one after another as P1 to P4.

7.4 KPH P1 150

7.4 KPH:
Forward speed: 7.4 km/h

P1:
First metering unit

150:
Metering quantity: 150 kg/ha

Area

This mode displays the performance data of the drill.

The field area, total area and the seed and flow rates in KG or Litres of the individual metering units are retrieved.

You can browse the display using the scroll buttons or the function key.

FIELD	7.2	HA

FIELD:
Field area

7.2 ha
Field area sown: 7.2 ha

TOTAL	689	HA

TOTAL:
Total area

689 ha
Total area sown: 689 ha

PROD 1	10335	KG

PROD 1:
Seed at first metering unit

10335 kg:
Seed quantity: 10,335 kg

PROD 2	6822	L

PROD 2:
Liquid fertiliser at second metering unit

6822 L:
Fertiliser quantity: 6822 L

☞ The quantities always refer to the last zero position.
Therefore, the data should always be checked prior to beginning work and reset.

Zero positioning:
All data must be selected individually and reset to “0”.

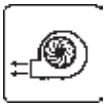
- Select required value.
- Hold the “OK” button down for 5 seconds.

To check, the value appears as 0 followed by a question mark.
E.g.:

FIELD	0	?

- If confirmed via the “OK” button, the value will be deleted. Any other button can be used to cancel at this point.

Fan speed



This mode displays the fan speed.
Two separate fan speeds can be displayed and monitored.

FAN 1	3800

FAN 1:
Speed of Fan 1

3800:
Speed: 3800 rpm

The scroll buttons can be used to change between the two speeds!

Attention!
The speed range of the fan should be between 3000 and 4000 rpm.

This speed range is adequate for most types of seed and working conditions.
These values should be entered as minimum and maximum values for the “Smart Alarm ™”.
See chapter “Minimum fan value” and “Maximum fan value”.

“Smart Alarm ™ ”
If the fan speed limit values are fallen short of or exceeded, the computer will activate an alarm,

e.g., fan speed too high:

FAN 1 TOO HIGH

The alarm indication appears every 10 seconds after confirmation via the “OK” button until the fan speed is again within the specified range.

Seed flow control

The seed flow control system monitors the flow of seed through the connected seed hoses.
120 seed pipes can be monitored on each machine.

Depending on the setting, the infrared sensors register the sensitivity and type of seed, as well as slight quantity deviations and, if the alarm is activated, also display the sensor sequence number.

Sensitivity
“SCANNING” mode is shown on the display via the “seed flow control” button. The mode is not active as long as SCANNING is switched to OFF.

SCANNING	OFF

Use the scroll buttons to adjust the sensitivity to between 1 and 10. The system is activated from sensitivity level 1 onwards.
The setting depends on the grain size as well as the seed type and weight.

Setting
Adjustments must be made when sowing at normal operating speed.
The sensitivity is set to 100 % of the seed quantity. Deviations from this are indicated by an alarm.

Use the scroll buttons to increase the sensitivity until “SCANNING” is displayed and the alarm signals are activated.
The position numbers plus BLK are displayed in flash mode.

The sensitivity must then be lowered until the indicator stops flashing. One to two steps are usually sufficient.

The further the sensitivity is lowered the larger the quantity difference until the alarm is activated.

During monitoring the sensors are displayed one after another.
If a number of sensors are installed, all sensors will be checked, but not each individual sensor will be displayed on the monitor.

SCANNING 12

The computer is in the process of monitoring sensor 12.

Numbering
The sensors are numbered consecutively starting from the module. The arrow marking on the cable points from the module to the first sensor.
The rest of the numbering is effected in the assembly sequence up to the last sensor.

Alarm
Immediately the flow of seed is interrupted or, depending on the sensitivity setting, the rate of flow deviates from the set seed rate, the relevant sensor signals this deviation.

In “seed flow control” mode, “SCANNING” is displayed together with the corresponding sensor number plus BLK. The latter flashes and the alarm signal is sounded.

SCANNING 9 BLK
(flashes)

If several pipes are blocked the sensor numbers are displayed one after another.

All other functions display the warning “NO FLOW AT 12” and the alarm is sounded.

NO FLOW AT 12

The alarm is extinguished when the fault has been remedied or the specified seed rate has been restored.

The alarm is also displayed if the seed rate is reduced, e.g., if the operating speed is decreased.
When the machine is used, faults can therefore still be displayed until the normal operating status has been attained again.

Turning
When the machine is raised, e.g., for turning, the alarm function is disabled because there is no work signal.
The pipes continue to be monitored and the fault signal as well as the sensor number plus BLK (flashing) are displayed.

SCANNING 9 BLK
(flashes)

The alarm signal is enabled again as soon as the machine returns to its operating position and the BLK stops flashing as soon as the specified seed rate has been restored.

☞ This is only displayed in seed flow control mode.

Function check
The fault signal sent out when the machine is raised - indicated by the displayed sensors and the number plus BLK - also makes it possible to check and test the sensors as well as ensure that the setting is correct.

☞ If a seed flow monitor is used it is therefore necessary to switch to the seed flow control function, both before starting work and every now and again. Furthermore, when turning you should also check for fault signals from any of the sensors with a BLK ending.

Settings

The “Function” button is used to switch to settings mode.
All machine and operating data must be entered here.
There are two setting levels in the menu for entering data.

Level 1

Press the “Function” button briefly.
The menu item “Show install” appears.
All menu items can be called in one after the other using the scroll buttons.
The mode displayed is started via the “OK” button.

Values can be changed in the modes via the scroll buttons and changes are stored via the “OK” button.

Menu overview Level 1

SHOW INSTALL ?

VR CALIBRATION ?

SEED CHECK ?

TRAM RHYTHM ?

DELTA STEP ?

“Show install” mode

The “Show install” mode displays all modules and sensors.
Select this via the “OK” button. You can browse the list using the scroll buttons.

SHOW INSTALL ?

The list is compiled by the computer each time the machine is switched on. It checks whether modules and sensor have been removed or whether new ones have been added.

If the computer registers a change in the configuration of the components, or does not recognise a component, it shows this on the display.

CONFIG. CHANGED ?

The change is acknowledged by actuating the “OK” button.
A faulty component is no longer included in the list and is, therefore, easy to find.
The overview of components at the beginning of the operating instructions can be used for comparison.

Faulty Component
In many cases, a fault alarm is triggered by poor contact at a plug-in connection.

Check the plug-in connections on the modules and the attached sensors.

Also disconnect all modules and plug-in connections in front of the defective component, as the signals are sent through all modules.

If the faulty component is again not recognised when restarting, it must be replaced.

“Calibration” mode

During the “calibration" test” the computer receives the calculation basis it needs to precisely control application.

The input value only requires the seed weight taken from the metering unit during the calibration test.

Therefore, as much seed as possible should be collected to keep measuring inaccuracies to a minimum.

Roller selection:
The appropriate roller must be selected and installed prior to the calibration test. This depends on the seed rate, driving speed and working width of the drill.

The following tables show the minimum and maximum seed rates with different working widths and the available roller sizes at a driving speed of 5, 10 and 15 km/h.

Other roller sizes are available upon request for special applications.

☞ The values in the setting tables have been calculated for 1 kg/litre (e.g., wheat). The specific weight of all types of seed must be taken into account and, e.g., in the case of a low specific seed weight, a larger roller must be installed.

Working width		3m		4m		6 m		7.5 m	
		Seed rate kg/ha		Seed rate kg/ha		Seed rate kg/ha		Seed rate kg/ha	
Roller	**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
30	5	18	150	14	113	9	75	7	60
	10	9	75	7	56	5	38	4	30
	15	6	50	5	38	3	25	2	20
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
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
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 rate kg/ha		Seed rate kg/ha		Seed rate kg/ha		Seed rate kg/ha	
Roller	**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
30	5	7	56	6	50	5	38	3	25
	10	3	28	3	25	2	19	2	13
	15	2	19	2	17	2	13	1	8
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
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
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 calibration:

- Place seed in the hopper (approx. 50 kg).
- Open the Venturi pipe and place a container (min 10 l) under the metering unit.
- Switch on the main switch at the switchbox of the DrillManager.
- Call up the menu item “VR calibration”.

VR CALIBRATION ?

Press “OK”.

PRODUCT 1

If there are several metering units, select the desired unit with the scroll buttons or PRODUCT 1 appears.

Press “OK”.
The last seed rate appears:

RATE 160 KG/HA

Press “OK”.

TURN OUT PRODUCT

The following appears:

REV 0.0

Switch the toggle on the motor module to calibration test.

By means of this switch, the metering unit can be switched on and off manually. This is only possible when the machine is at a standstill!

The metering unit starts up and the computer counts the revolutions.

☞ No specific calibration weight is required. The higher the calibration weight the more accurately the weight can be determined.

Switch off the metering unit once the container is full or the desired calibration weight has been reached.

Weigh the calibrated seed quantity.

Enter the weight of the calibrated quantity in the display in grams. If scales read 2 decimal places always add 0 e.g. 3.04kg should be entered as 3040g.

WEIGHT 3040 G

Press “OK”.

The driving speed possible will be displayed:

SPEED RANGE 4.2-13

Press “OK”.

VR CALIBRATION ?

If the displayed speed range corresponds to your required operating speed and is within a driveable range, you can start the next calibration test.

The scroll buttons can be used to change to the next “Product”.

If the specified speed is too high, the next smallest roller must be installed.
If the specified speed is too low, the next largest roller must be used.

VR CALIBRATION ?

Then repeat the calibration test.
If no other metering units are connected, the calibration test can be terminated at this point.

Liquid fertiliser calibration:

VR CALIBRATION ?

Select “Product 2” for liquid fertiliser using the scroll buttons.

PRODUCT 2

Press “OK”.

The display “Pulses / L 600” appears.
This means that the computer registers each 600 pulses as being a flow rate of 1 litre.

PULSES / L 600.0

Confirm with “OK”.

The display jumps back to “calibration”.

When using AHL liquid fertiliser: “600 pulses/L”.

When using suspensions, e.g., phosphate fertilisers: “550 - 570 pulses/L”.
The settings can be different depending on the manufacturer.

If, in practical application, deviations can be observed in the liquid fertiliser quantities applied, the pulse value can be adjusted.

To do this, convert the deviation to % and then change the pulse value by the same percentage.

☞ If the quantity applied is higher than the quantity displayed, the pulse value must be increased.
If the quantity applied is lower than the quantity displayed, the pulse value must be decreased.

“Seed check” mode

With this mode, the metering accuracy can be checked and corrected if necessary.

At the same time, the seed is calibrated. The computer counts the revolutions and, on the basis of these, calculates the weight.
This weight must be compared with the actual weight and deviations corrected in the computer.

☞ This mode is never to be used as a calibration mode when changing seed!

Open the Venturi pipe and place a container underneath it.

☞ No specific calibration weight is required. The higher the calibration weight the more accurately the weight can be determined.

Select “SEED CHECK” via the scroll buttons.

SEED CHECK ?

Press the “OK” button and select “PRODUCT 1” via the scroll buttons.

PRODUCT 1

Press “OK”.

TURN OUT PRODUCT

Switch the toggle on the motor module to calibration test.

The computer counts the seed rate.

WEIGHT 3040 G

Switch off the metering unit once the container is full or the desired calibration weight has been reached.

Weigh the calibrated seed quantity and compare with the display.

In case of deviations, the displayed weight can be adjusted to the actual weight using the scroll buttons.

If the setting is confirmed via the “OK” button, the computer accepts the new weight.

The speed range possible is displayed.

SPEED RANGE. 4.2-13

Press “OK”.

SEED CHECK ?

In the case of further metering units, a change can be made to the next “product” via the scroll buttons, or can be cancelled with any other button.

The liquid fertiliser cannot be controlled.

Delta step

DELTA STEP ?

The percentage by which the seed rate can be changed via the pushbutton fold switch is entered in the menu item “DELTA STEP” (see Adjustment of the application rate via the fold wings switch).

Select with the “OK” button and set the desired percentage with the scroll buttons.
Confirm the value with the “OK” button.

Normally 10% is entered here. This value is adequate as the push-button switch can be used to reset the value and the setting increases by the same value.

Tram rhythms

TRAM RHYTHM ?

Tram row channels 1 and 2 are controlled in tramline rhythm.
The rhythm is defined by the width of the drill and the width of the sprayer.

The tables “Tramline rhythms” provide an overview of the rhythms and entry of the sequence of numbers.

The numbers 0 to 3 have the following functions:

0	=	Channel 1 off Channel 2 off
1	=	Channel 1 on Channel 2 off
2	=	Channel 1 off Channel 2 on
3	=	Channel 1 on Channel 2 on

Entry:

- Confirm the display with “OK”.
- Enter the sequence of numbers from the rhythms table using the scroll buttons.
- Confirm each number via the “FUNCTION” button.

E.g. (see table)
Working width: 6 m
Spraying width: 30 m

0 0 3 0 0

Confirm the entry with the “OK” button.

If a sequence of numbers should be deleted, hold the “Minus” (-) scroll button down until a minus sign appears on the display. The following numbers will be deleted.

Program 00300 means:
Passes with “0” have no tramline.
In the third pass (“3”) both channels are activated and the tramline is used.

The rhythm can contain up to a maximum of 32 passes before it is repeated.

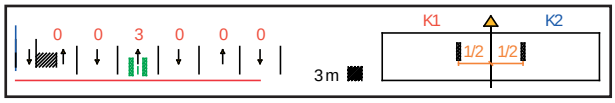
Tables:

The tables show the individual rhythms for starting work at the left-hand side of the field.
The arrows in the tables indicate the individual sowing passes and the direction of travel.
The green passes mark the tramlines and the red bar corresponds to the width of the sprayers.

Some combinations of seed drill width and sprayer have two different rhythms.
They have different valve configurations inside the machine.
These can be fitted in the centre of the machine or on the outside.

E.g. ,drill 6 m, spraying width 36 m

Central valve configuration:



The first pass must be over drilled.
The tables show the mounting points of the valves on the right-hand side of the machine.
The valves on the left side of the machine are always connected to channel 1 and those on the right to channel 2.

The left side of the table shows the machine widths and the tramline rhythms.

The shaded areas must be over drilled with half of the seed drill width. Here the first pass is sowed with the last pass number so that the machine starts with the first rhythm pass number when over drilling.

Outside configuration:

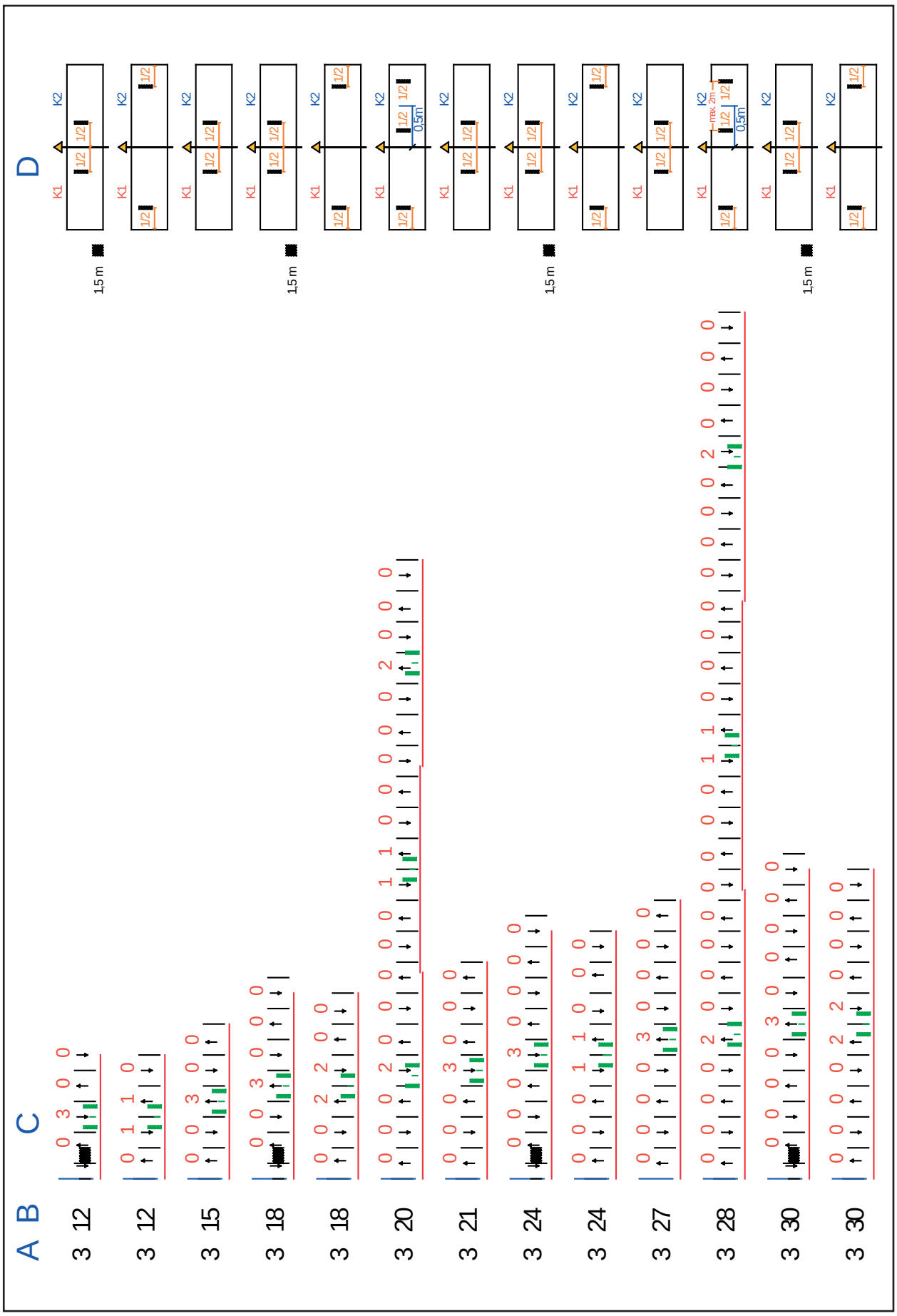
It is not necessary to over drill the first pass if the valves are fitted to the outside.
The tramlines are created in one pass in each direction. It is therefore necessary to manoeuvre the machine extremely accurately on the connecting passes.

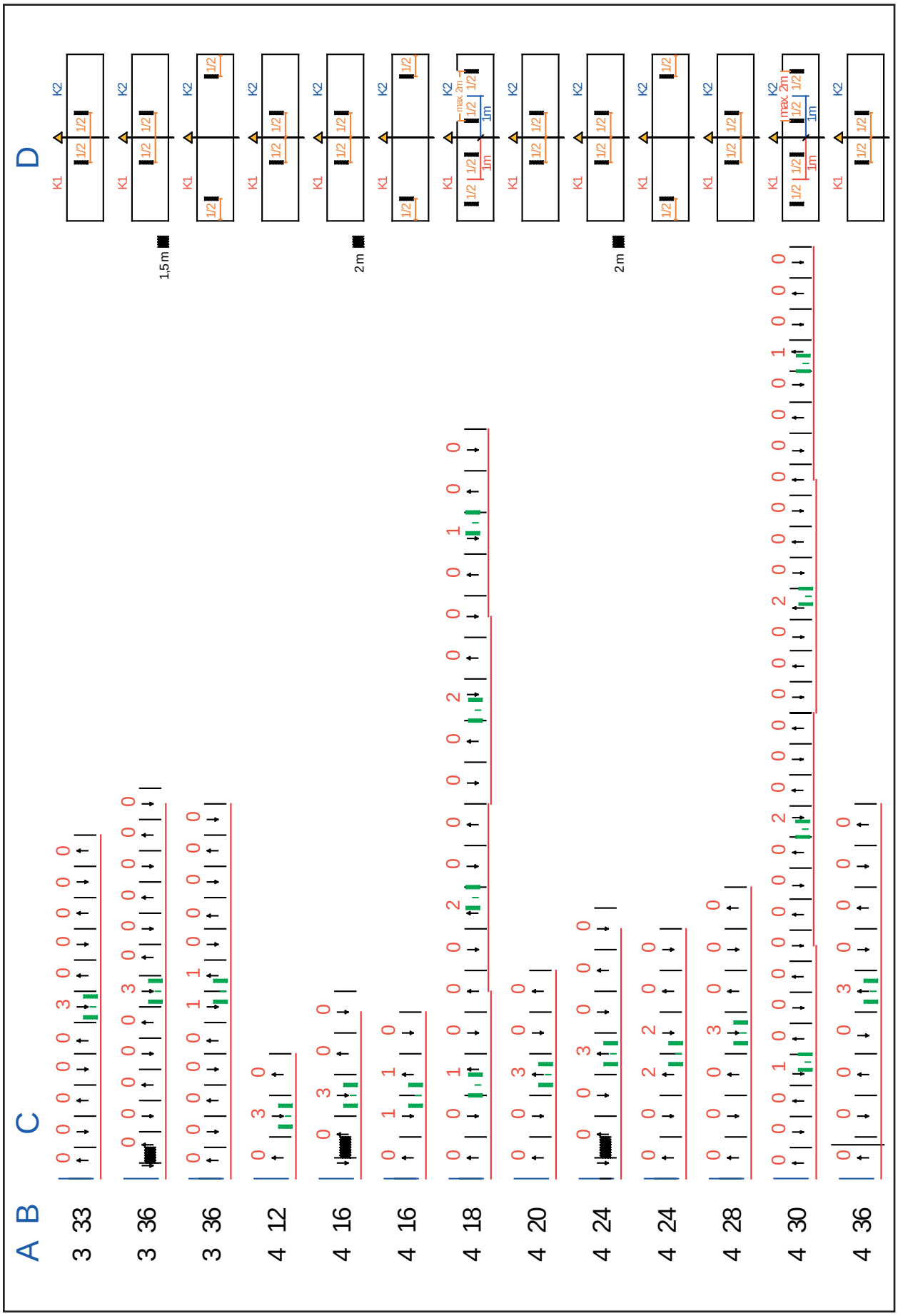
If the valves are attached to both sides of the machine it is possible to start on the left or right of the field.

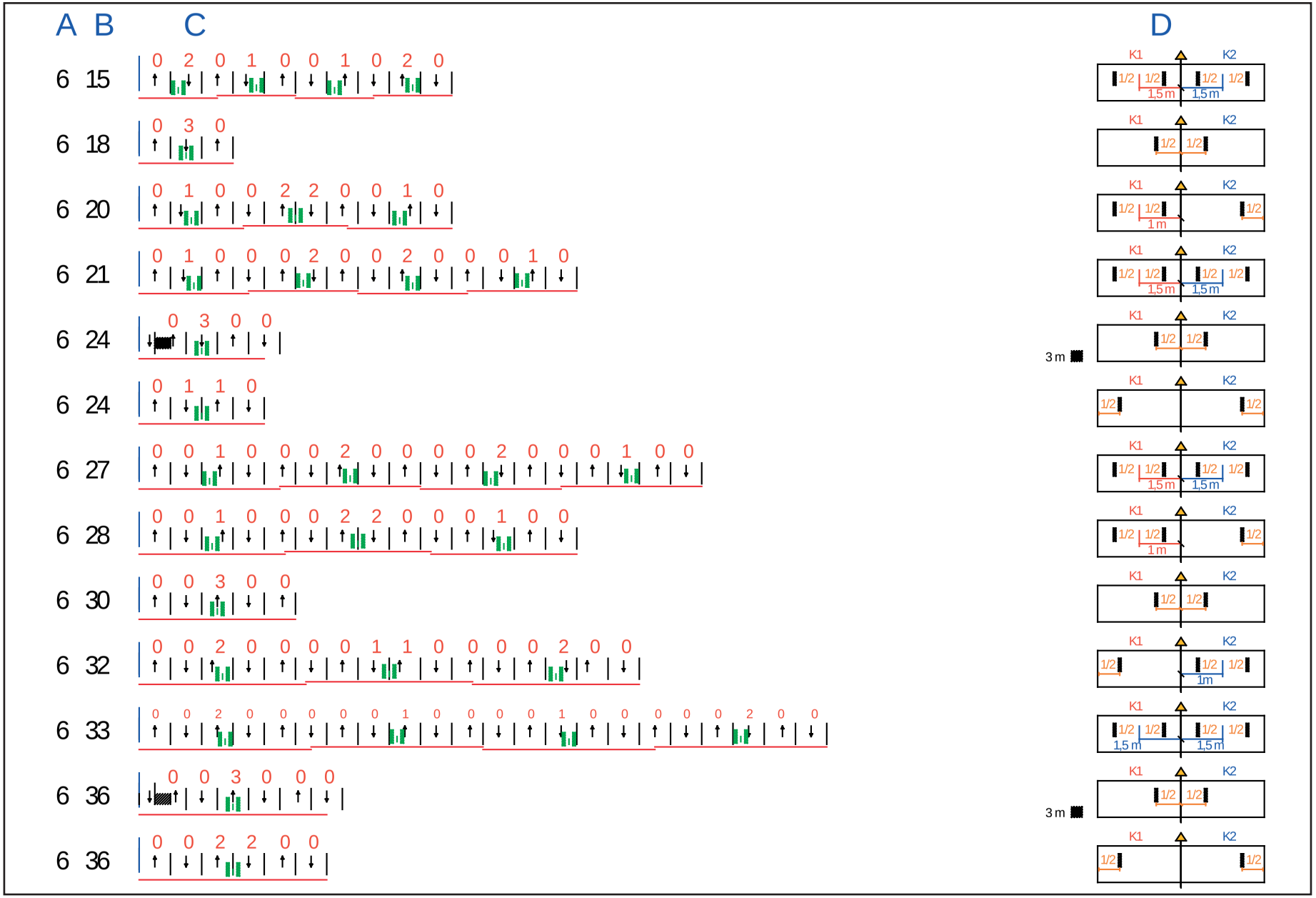
Measure half of the tramline from the outside from the outer coulter plus half a coulter gap.

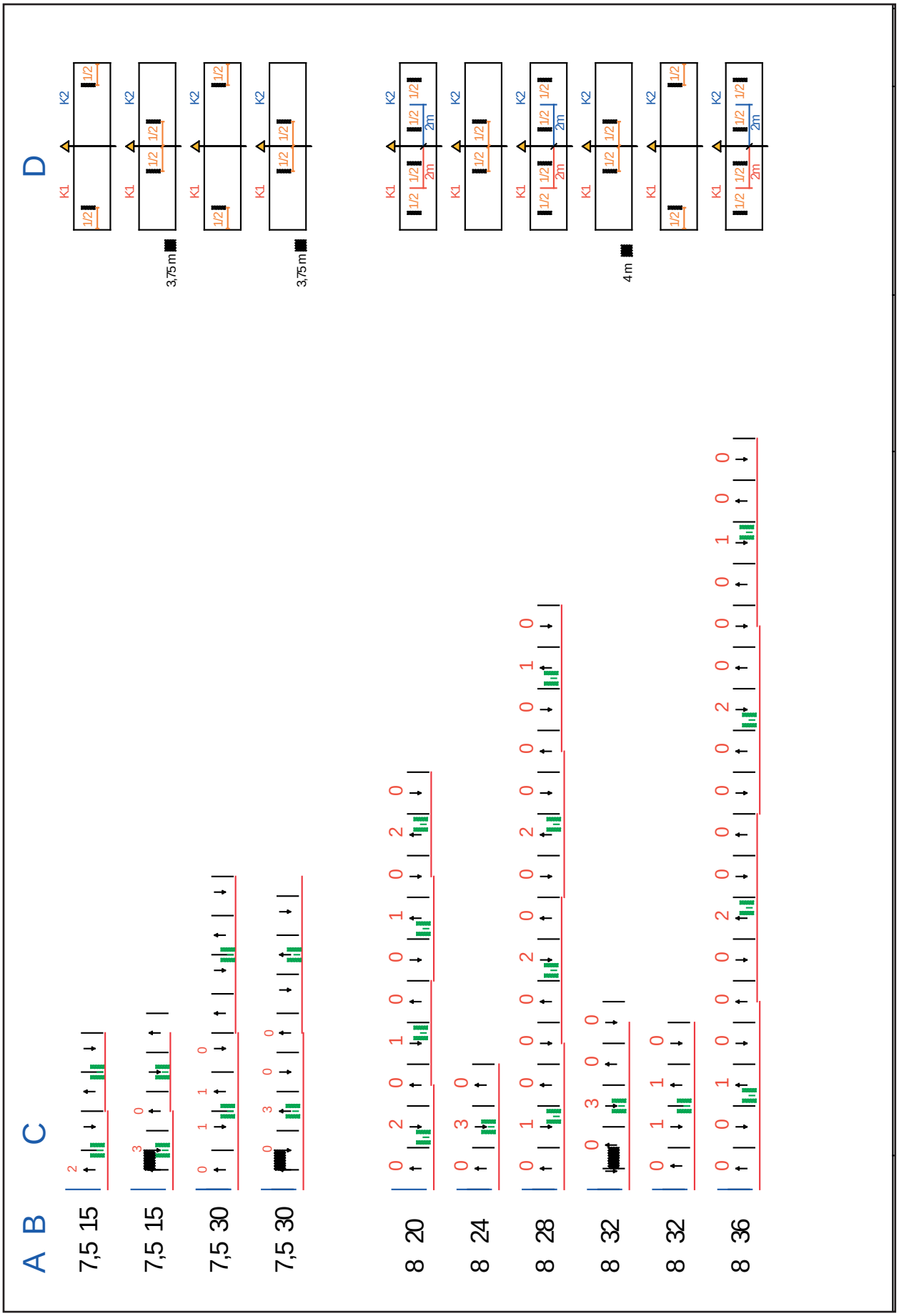
Notes regarding the tables

Column A: Working width of the drill
Column B: Working width of the sprayer
Column C: Entry of rhythms
Column D: Mounting points of the magnetic valves


A B C D
3 12
3 12
3 15
3 18
3 18
3 20
3 21
3 24
3 24
3 27
3 28
3 30
3 30
1,5 m
K1
K2
1/2
0,5m
max. 2m

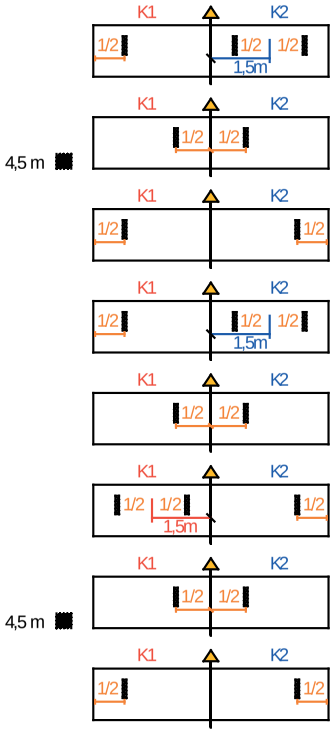

A B C D
3 33
3 36
3 36
4 12
4 16
4 16
4 18
4 20
4 24
4 24
4 28
4 30
4 36
K1
K2
1/2
1,5 m
2 m
2 m
max. 2m
1m

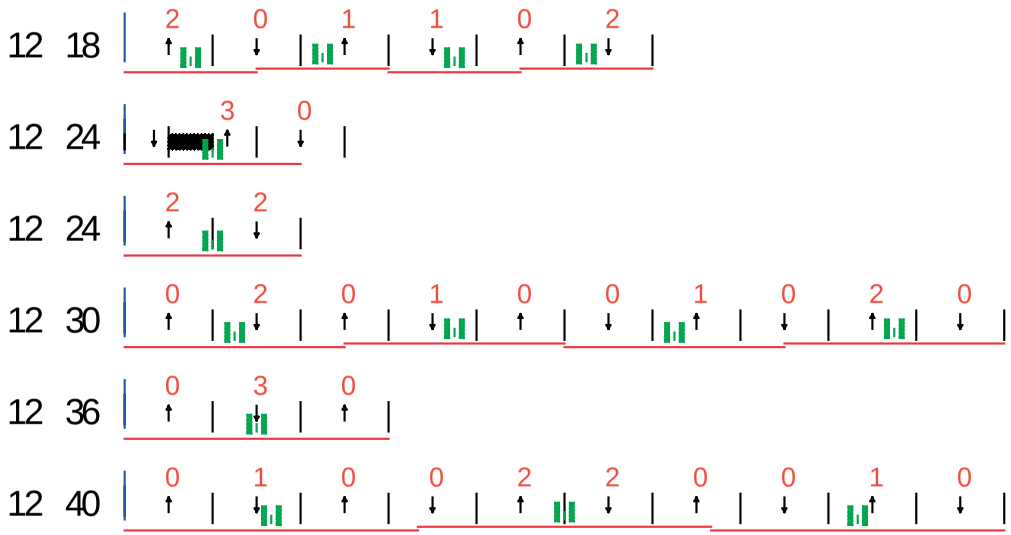

A B
C
D
6 15
0 2 0 1 0 0 1 0 2 0
6 18
0 3 0
6 20
0 1 0 0 2 2 0 0 1 0
6 21
0 1 0 0 0 2 0 0 2 0 0 0 1 0
6 24
0 3 0 0
6 24
0 1 1 0
6 27
0 0 1 0 0 0 2 0 0 0 0 2 0 0 0 1 0 0
6 28
0 0 1 0 0 0 2 2 0 0 0 1 0 0
6 30
0 0 3 0 0
6 32
0 0 2 0 0 0 0 1 1 0 0 0 0 2 0 0
6 33
0 0 2 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 2 0 0
6 36
0 0 3 0 0 0
6 36
0 0 2 2 0 0
K1
K2
1/2
1,5 m
1 m
3 m

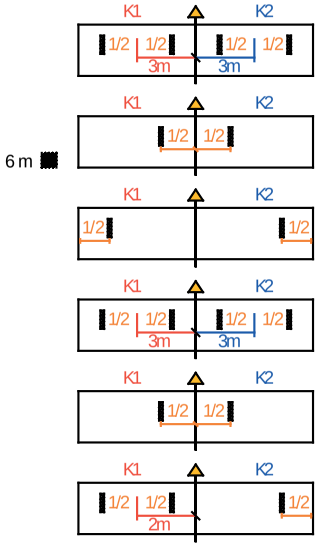

A B C D
7,5 15
7,5 15
7,5 30
7,5 30
8 20
8 24
8 28
8 32
8 32
8 36
K1
K2
1/2
2m
3,75 m
4 m

A	B	C
9	12	2 1 1 2
9	18	3 0
9	18	2 2
9	24	0 2 0 1 1 0 2 0
9	27	0 3 0
9	30	0 1 0 0 2 2 0 0 1 0
9	36	0 3 0 0
9	36	0 1 1 0

D




A B C
12 18
2 0 1 1 0 2
12 24
3 0
12 24
2 2
12 30
0 2 0 1 0 0 1 0 2 0
12 36
0 3 0
12 40
0 1 0 0 2 2 0 0 1 0


D
6 m
K1
K2
1/2
3m
2m

Level 2

In the second setting level, the machine and application-oriented data are entered and stored.

This data is only entered when the machine is installed for the first time and need not be changed again for sowing.

All menu items can be called in one after the other using the scroll buttons.

The mode displayed is started via the “OK” button.

Values can be changed in the modes via the scroll buttons and changes are stored via the “OK” button.

Hold the “FUNCTION” button down for approx. 5 seconds.

The first menu item “SMART ALARM” appears.

Some of the operating data is entered and stored at the factory.

The application-oriented data will be entered by our sales representatives when familiarising you with the machine.

☞ Enter this data in the checklist “Entry values level 2”. This list is to be found in the chapter “DrillManager” in the appendices. You can then refer to these values later if the operating data changes or data is adjusted.

Menu overview Level 2:

- UNITS METR/US ?
- DISTANCE CHECK ?
- CIRCUMFERENCE ?
- WIDTH ?
- FAN LOW ?
- FAN HIGH ?
- FAN TARGS/REV. ?
- TOTAL SEED ROWS ?
- TRAM ROW - CH1 ?
- TRAM ROW - CH1 ?
- LANGUAGE ?
- VR CALIBRATION #1?
- GPS ?

Units metr/US

```
UNITS  METR/US  ?
```

Here you can choose between “metric” (METR) and “american” (US) units of measurement.

Press the “OK” button and select the desired unit of measurement with the scroll buttons.
Confirm the setting via the “OK” button.

“Distance check” mode

```
DISTANCE CHECK ?
```

“Distance check” mode is used to check and compare the actual distance and the distance which is specified by the computer.

To do this, a distance of 100 metres must have been covered and the two values compared.

The computer receives the radar signals and processes these with a distance value from the menu item “circumference” (second setting level).

Distance check:

```
DISTANCE CHECK ?
```

Press “OK”.

```
DIST        0.0     M
```

Start now and drive the 100 metres.

```
DIST        103.4   M
```

If the display shows more/less than 100 metres, the value must be corrected.

Automatic correction

Use the scroll buttons to adjust the displayed value (e.g., 103.4) to the actual distance (e.g., 100 m) and confirm by pressing “OK”.
The adjustment is automatically transferred to the “circumference” setting and saved.

For the purpose of checking, the “DISTANCE CHECK” should be performed again.

The entry should be as accurate as possible as the computer uses this value as the basis for all calculations (metering, speed indication and area calculations).

Circumference mode

```
CIRCUMFERENCE  ?
```

The distance between the radar signals is entered in the menu item “CIRCUMFERENCE”. The value is set to 21.2 mm.

This value should be checked once via the “DISTANCE CHECK” mode (see setting level 1) and corrected if necessary.

Width

WIDTH ?

The working width of the drill is entered in mm in the menu item “Width”.

Fan LOW mode

FAN LOW ?

The minimum speed for the fan is entered in the menu item “FAN LOW”.
The speed entered should be set high enough that, if it is fallen short of, no pipe becomes blocked.

This entry is for the Smart Alarm.
If the speed is fallen short of, the alarm is activated.

Fan HIGH mode

FAN HIGH ?

The maximum permissible speed for the fan (e.g., 5000) is entered in the menu item “FAN HIGH”.

This entry is for the Smart Alarm.
If the speed is exceeded, the alarm is activated.

Fan targets/Rev. mode

FAN TARGS/REV. ?

The number of speed signals per fan revolution is entered in the menu item “FAN TARGETS/REV”.

This entry depends on the fan.
- Crarry fan 3 (clamping screws on fan shaft - until approx. April 2004)
- Crarry fan 2 (two bolts on impeller - as of April 2004)
- Accord fan 4

Total seed rows

TOTAL SEED ROWS ?

The number of coulters must be entered in the menu item “TOTAL SEED ROWS”.

The reduction in the seed rate in the case of tramlines is calculated on the basis of this.

The minimum entry is 10 seed rows.

Tram row - channel 1 and 2

TRAM ROW - CH1 ?

The tramline mode is divided into tram row channels 1 and 2.

This makes many combinations and possibilities available to lay out a tramline for almost all working widths.
The tram rows can be controlled individually or together (see “tramline rhythms”).

The number and position of the magnetic valves are entered in the menu item “TRAM ROW - CHANNEL 1 and 2”.
To do this, a fictitious number (1 - 24) is entered for each magnetic valve.
The magnetic valve must only be entered with the number of the sensor when the seed pipe is monitored by a seed flow sensor (see numbering of sensors in the chapter “seed flow control”).

Number:
While sowing the reduction in the seed rate is calculated on the basis of the number of magnetic valves.
A maximum of 4 magnetic valves can be installed and entered per channel.

Position:
With a seed flow control system, the computer recognises the magnetic valves that are equipped with a seed flow sensor.
If these magnetic valves are switched, the computer ignores the sensors since, otherwise, a seed-flow fault would be signalled.
Channel 1 - Valves on the left side of the machine
Channel 2 - Valves on the right side of the machine

Entry:
- Confirm the display “TRAM ROW” with “OK”.
- Enter the number via the scroll buttons.
- Press “FUNCTION” to move to the next input box.
- Confirm the last entry with “OK”.

Number allocation without a seed flow monitoring system.

When there is no seed flow control system, any number from 1 to 24 can be allocated to each magnetic valve.

Merely the number of numbers allocated must be identical to the number of magnetic valves in each channel so that the reduction in the seed rate can be calculated correctly!

The possibility of retrofitting the seed flow control system should be taken into account. Therefore, the numbers entered must begin at 7, as 6 sensors are supplied with the basic separate system.

The channels will then not have to be reprogrammed unless the sensors are installed in seed pipes with magnetic valves.

E.g.:
3 magnetic valves in channel 1.

7 8 9 0

3 magnetic valves in channel 2.

11 12 13 0

The DrillManager calculates the reduction in the seed rate on the basis of these entries and the number of seed rows.

If channel 1 or channel 2 is switched, the seed will be reduced by 3 seed rows in each case. If both channels are switched, the seed will be reduced by 6 seed rows.

Number allocation with a seed flow monitoring system.

All pipes are monitored:

When there is a seed flow control system in all seed pipes, the magnetic valves must be given the numbers of the sensors.
The numbers must be entered in the appropriate tram row channels.

The sensor numbers are defined by the sequence in which the sensors are connected (see “Seed flow control”).
After this, the sensors are not to be rearranged.

When a tram row channel is switched, the computer compares the entries in the list of valves and removes the sensors with the same numbers from the monitoring system.

E.g.:
The magnetic valves for channel 1 are installed in the seed pipes with the sensor numbers: 8, 12, and 17.

8	12	17	0

If channel 1 is switched, the seed flow will be reduced by 3 seed pipes and the sensors 8, 12 and 17 will be removed from the monitoring system.

Some pipes with magnetic valves will be monitored:

If some seed pipes are equipped with magnetic valves and seed flow sensors, the numbers of the seed flow sensors must be entered in the appurtenant tram row channels.

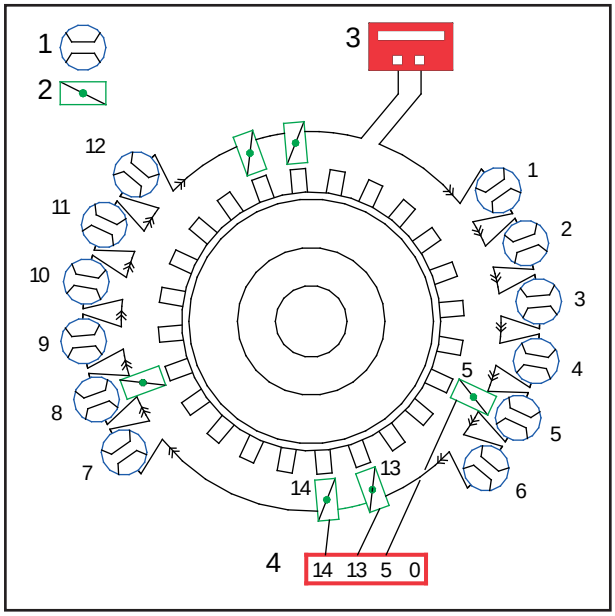
The other valve numbers can be freely chosen (1- 24) as in the case of the entry when no seed flow monitoring system is installed.
However, the numbers should be higher than the total number of sensors since, otherwise these sensors will be removed from the monitoring system.

E.g.:

- 12 sensors are installed in a machine.
- 3 magnetic valves are connected at “tram row channel 1”. In addition, a seed flow sensor is installed in one seed pipe. The seed sensor has the number 5.

14	13	5	0

When tram row channel 1 is controlled, the seed rate will be reduced by 3 seed pipes and sensor number 5 removed from the seed flow monitoring system.



Tram row channel

1 - Seed flow sensors
2 - Magnetic valves
3 - Seed flow module
4 - Display “Tram Row 1”

Language

LANGUAGE ?

You can choose between 8 different languages in the language menu.
The languages are distributed over two different computers (display boxes).

Version A: German,
English,
French,
Czech

Version B: Hungarian,
Danish,
Polish,
Spanish

Press the “OK” button and select the desired language via the scroll buttons.

Confirm the setting via the “OK” button.

Calibration test, direct entry

VR CALIBRATION # 1?

If a seed or liquid fertiliser is used repeatedly, only the first calibration test must be performed and the calculated value noted.
After a calibration test, this value is indicated in this function and can be entered directly when using the same seed or liquid fertiliser. The calibration test need not then be repeated.

☞ This procedure should only be followed when absolutely the same seed or liquid fertiliser is used. Otherwise, a new calibration test is recommended.

The roller used in the calibration test must be installed, otherwise an incorrect seed quantity will be distributed.

VR CALIBRATION # 1?

Press “OK”.
The last seed quantity appears in grams per revolution of the metering unit.

CAL #1 115.5 G/R

Set the desired value with the scroll buttons and confirm with “OK”.

The same function is possible for the liquid fertiliser under calibration test 2.
Due to the different liquid fertiliser consistencies, the impulse value must we adjusted in each case.
The pulse value can be changed here directly when using a known fertiliser.

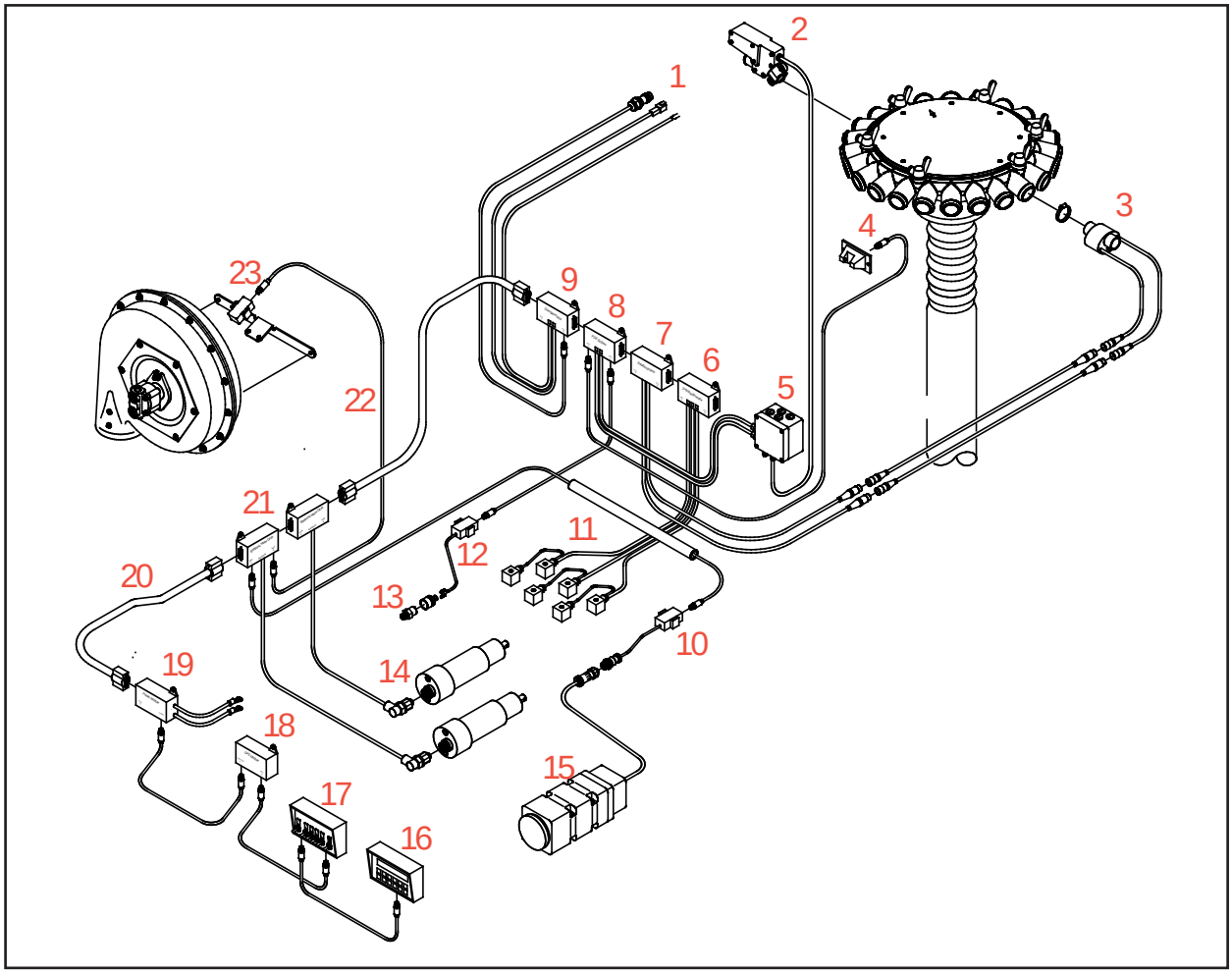
VR CALIBRATION # 2?

Press “OK”.
The last number of pulses per litre of liquid fertiliser appears.

PULSES / L 600.0

Set the desired value with the scroll buttons and confirm with “OK”.

Assembly information



Assembly overview

1. Flow control connection
2. Magnetic valve, tramline control system
3. Seed flow sensor
4. Low-level indicator
5. Distribution box for tramline control system
6. Hydraulic control system module
7. Seed flow monitoring system module
8. Tramline control system module
9. Liquid fertiliser control system module
10. Speed adapter
11. Hydraulic block plug connector
12. Work signal adapter
13. Pressure switch, work signal
14. Metering drive motor
15. Radar equipment
16. Display box
17. Switchbox
18. GPS module
19. Power module with battery cable connection
20. Module connection cable
21. Metering control system module
22. Signal connection cable (MiniDIN cable)
23. Fan speed sensor

Connection of the sensors when using the 6-channel module

Plug all sensor cables into the 6-channel module, except for the cable for the flow sensor, which remains in the liquid fertiliser module.
The cable from the radar adapter must be plugged into channel 1.

Connection of the sensors to the modules

Motor module:

“A” Radar adapter
“B” Fan sensor

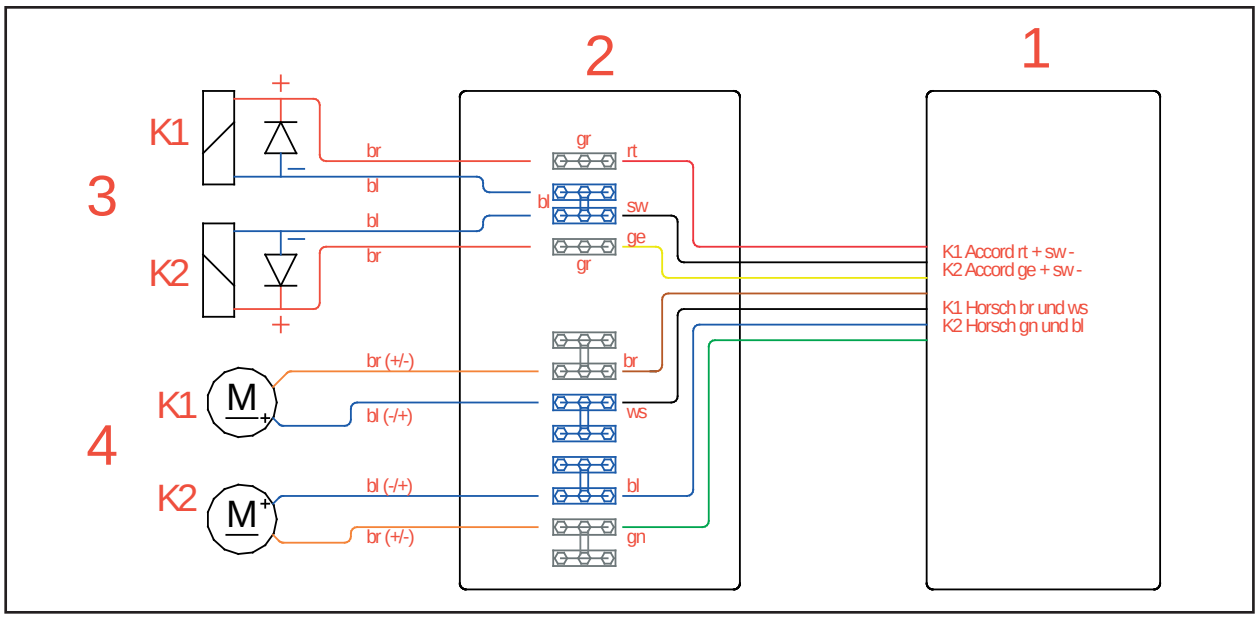
Tramline system module:

“A” Low-level indicator
“B” Work sensor

Liquid fertiliser module:

“B” Flow sensor

ATS distribution box connection



Distribution box connection diagram

1. Tramline module with one cable.
   Cable for HORSCH valve, channel 1 brown and white and for channel 2 green and blue. The polarity varies when the tramline is switched on or off for approx. 5 seconds.
   Cable for Accord magnetic valves and the PE marker. Channel 1, plus is red and for channel 2, plus is yellow. The earth for both channels is black.
   Continuous current is applied when the tramlines are activated.

2. Distribution box, tramline control system.
   Because of varying polarity, the cables must not be clamped together.
   Risk of short-circuit! Cables may only be connected as specified.

3. Solenoid valves or PE markers.
   The markers and valves are controlled by continuous current in tramline mode.
   The cables must not be interchanged, otherwise a diode in the magnetic valve can burn out, or cause a short-circuit.

4. HORSCH tramline valves.
   When the tramline is switched on and off, the HORSCH valves are each activated for approx. 5 seconds with varying polarity.

Alarm signals

Motor overload

The metering shaft turns sluggishly due to a fault in the metering unit (defective bearing, or foreign bodies in the metering unit) and the electric motor is overloaded.
The system differentiates between two types of overload and indicates these differently.

Overload
If the drive is overloaded for longer than 1 minute (14 amp current input approx.) the signal below is displayed:

Confirm overload

An alarm is also activated.
Confirm the alarm by selecting “OK”. Action is not absolutely necessary.

If this alarm appears again after a short time, the indication must be acknowledged again.

The cause of the overload should be found and remedied to avoid any damage to the metering drive.

Motor overloaded
If the drive is blocked or if, for another reason, the power input increases sharply, the following message appears:

Motor overloaded

In addition, a siren-type alarm sounds; in this case, stop immediately.

The alarm sound and the warning can only be deactivated by shutting down the system.
The fault must be remedied, otherwise further operation will not be possible.

Power input
On Vers. 20 and later versions it is possible to display the power input (amps) for the metering drive.
This can be useful for troubleshooting and enables damage to be detected early on as the power input is increased by the presence of foreign bodies or due to defective bearings.
The power input is normally around 10 amps depending upon the seed type and quantity.
Over approx. 14 A, the warning “overload” appears, and over approx. 20 A, the system switches off due to overload, with the indication “motor overloaded”.
To measure the current, switch to the “variable rate mode” display and press the “+ and -” buttons together.

Double-beep alarm

In case of conflicting signals (operating status), the DrillManager sounds a double-beep alarm every 3 seconds.

Speed signal present - operating signal missing.

If, during sowing, the transportation position is signalled to the Drill Manager due to a faulty pressure switch or a faulty, or not activated float position, the Drill Manager switches off the metering drive and the double-beep alarm sounds.

The pressure switch operates in the hydraulic system above approx. 50 bar.

The cause of the fault is to be remedied in order to prevent incorrect spacing when sowing.

The alarm signal also sounds when turning and when driving on the road.

When driving on the road and when filling the hopper, the alarm signal can be switched off via the drill “ON/OFF” switch.

Speed signal missing - work signal present.

If the speed signal fails during sowing, the computer switches to an emergency operating program.

- Machine in operating position (machine lowered - hydraulic system depressurised).
- Speed signal missing (radar faulty, cable connection interrupted).

The double-beep alarm sounds and the alarm indication “COMM ERROR SPEED” appears alternately with the indication “TEST SPEED ON”.

COMM ERROR SPEED

TEST SPEED ON

In the emergency operating program, the computer sets the driving speed at 8 km/h. The metering drive continues to run with the rpm for 8 km/h.

You can continue to work at 8 km/h until the cause is remedied.

As soon as the signals are again active, the audible alarm stops and the DrillManager takes over control.

Fault alarm

If the connection to a component is interrupted or faulty for more than 8 seconds, an alarm is triggered and the faulty component displayed.

The cause of the fault should be remedied immediately. If this is not possible, the drill can be switched off and the module containing the faulty component removed.

When you start up again, the message “config. changed” appears. The new component configuration is accepted by confirming the message and sowing can be continued.

If several faults occur simultaneously, only the first cause is indicated.

If the alarm indication “COMM ERROR” appears only briefly, the system was able to restore the connection and repair itself.

Possible fault alarms:

SCB	switchbox
EMD	motor module
TRM	tramline module
GPS	GPS module
SPEED	radar adapter
BIN	low-level indicator
XBX	power module
SFT	shaft sensor
3LM	hydraulic module
ARM	seed flow module
LCM	liquid fertiliser module
FAN	fan sensor
WORK	operating switch
FLOW	display
HALF	1/2 width shut off

If several modules with the same function are connected, the number, e.g., “BIN 2” appears after the fault alarm.

☞ Fault alarms: See also overview “Smart Alarm” table in the section faults and remedies.

Faults and remedies

General information

Servicing
Do not wash the components of the drill control system (modules, sensors) with high pressure hoses!

Repairs and welding work
Prior to performing any repairs on the drill, particularly on the DrillManager, the main switch is always to be switched off and the power supply disconnected.
Otherwise induction voltages can destroy electronic components when disconnecting cables and modules.
The components can also be damaged when performing welding work on the machine. Therefore, disconnect the components from the machine prior to this. When arc welding, connect the ground cable as close as possible to the weld point and ensure a good ground connection!

Electromagnetic waves
The drill control system contains components which can react sensitively to “electromagnetic waves”. The use of radio equipment/mobile phones near the computer can cause disturbances.

Electrostatic charging
Under certain conditions, e.g., intense dust development, a specific soil composition and a humidity of less than approx. 45%, components can become electrostatically charged and cause faults in the DrillManager when discharging.

To prevent these faults, connect all components in the air flow, fan, Venturi pipe, motor, seed tower, etc., to the frame.
This connection must be electrically conductive and can be established by means of earth cables or by scratching off the paint under the screws.
In addition, shielded cables or modules with electric filters can be installed.

General
If problems arise with the drill control system that you cannot identify, proceed as follows:

- Check the list of components in the computer for completeness and compare this with the list of components in the operating instructions.
- Check all values entered in the level 2 entry menu.
- Check all plugs and plug-in connectors.
- Check and ensure individual sensors are working properly. Speed sensors - LED on the sensor must be flashing.
  Low-level indicator - interrupt the beam of light with your hand. The bin indicator must change.
  Seed flow sensor - bypass the corresponding sensors.
- Check the earth connections of the components and the machines up to the tractor.
  Connect the components with the machines and the machines themselves with the tractor by means of additional cables.

Faults

Problem:
No display on the computer monitor.

Cause/Remedy:
- Check electricity supply.
- Interchange cable connections in the switch-box.

Problem:
Metering unit revolves at max. speed and can only be switched off via the master switch.

Cause/Remedy:
- EMD module faulty.
- Replace EMD module.

Disturbances to seed flow:
Display shows number of a seed-rate sensor, blinks and signals alarm:

- The seed pipe with the number shown is blocked - clean relevant seed pipe and check fan setting.

- The sensor is contaminated, particularly when sowing rape seed - disconnect the seed pipes and clean the inside of the sensors with a damp cloth.

- ERROR or another indefinable error appears on the display.
  -Voltage or signal supply interrupted.
  -Sensor or seed flow module faulty.

Trouble-shooting:
- Plug in only the first or last sensor - if the error message is no longer displayed, the fault is in one of the remaining sensors. Check all sensors and plug-in connections one after the other.

- If the fault alarm continues to be displayed - check another sensor.
- If the fault alarm disappears, the first sensor is faulty.

  If the fault alarm continues to be displayed, the cable connection or the seed flow module can be faulty.

- A sensor can also be directly connected to the seed flow module to check the cable connections.

Smart Alarm functions and information		
Monitor display	**Meaning**	**Measure**
SEEDER UP / DOWN	Confirming drill position	
PRESS KEY TO ACK.	Request to acknowledge by pressing any key	With any key
BIN 1 (1 - 5) EMPTY	Alarm - bin 1 (1 - 5) empty	Fill bin 1 (1 - 5)
FAN 1 (2) LOW	Alarm - fan 1 (2) speed too low	Check the hydraulic fan drive
FAN 1 (2) HIGH	Alarm - fan 1 (2) speed too high	Check the hydraulic fan drive
FAN 1 (2) OFF	Alarm - fan 1 (2) off	Check the hydraulic fan drive
SHAFT 1 (1 - 5) OFF	Alarm - shaft 1 (1 - 5) not rotating	Check the shaft drive
UNABLE TO RESET	Alarm - computer cannot restart seed flow sensor	Check seed flow sensors
FLOW ERROR / HELP	Alarm - fault at seed flow module	Check seed flow module
NO FLOW AT	Alarm - no seed flow at sensor No.	Check seed hose
CONFIG. CHANGED	Alarm - components (modules, sensors) changed	Check components
COMM. ERROR AT	Alarm - communication problem between computer + component	Check cable connections
> 1 SPEED	Alarm - configuration error by computer	Check cable connections
CHECK INSTALL.	Alarm - configuration error by computer	Check cable connections
> 1 WORK	Alarm - configuration error by computer	Check cable connections
> 2 FANS	Alarm - configuration error by computer	Check cable connections
> 5 BINS	Alarm - configuration error by computer	Check cable connections
> 5 SHAFTS	Alarm - configuration error by computer	Check cable connections
> 5 CLUTCHES	Alarm - configuration error by computer	Check cable connections
> 1 FLOW	Alarm - configuration error by computer	Check cable connections
SPEED LOW / HIGH	Alarm - speed for metering unit too low / high	Increase / decrease speed
NO CAL W/SPEED	Alarm - speed is missing	Check speed signal
CAL SWITCH ON	Alarm - switch on EMD at “calibration”	Place switch on EMD module to “run”
CAL REQUIRED	Alarm - calibration required	Calibrate
MOTOR OVERLOAD	Alarm - motor is overloaded	Check metering drive and metering unit
NO RHYTHM	Alarm - no tramline rhythm	Enter tramline rhythm
MANUAL OVERDRIVE	Manual operation is switched on, metering unit is turning at 15 rpm	Place switch on EMD module to “run”
LIQUID RATE LOW / HIGH	Alarm - actual fertiliser rate too low / high	Decrease / increase speed