// OPERATING INSTRUCTIONS

K-TRONIC

Control system

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English

The control system k-tronic

The control system for truck-mounted spreaders and three-point spreaders

The control system k-tronic for truck-mounted spreaders and three-point spreaders consists of two major electronic components, the master and the slave.

The master (Version V4)

The master is the operating unit in the driver's cab. All settings concerning the spreading operation are made from the master. The master is installed easily accessible in the driver's cabin. By means of the plug-and-socket connection, it can be easily replaced or removed. By means of a permanently installed cable set, the firmly installed socket of the plug-and-socket connection is connected with the central plug connection behind the driver's cabin. The length of the permanently installed cable set is adjusted to the respective vehicle.

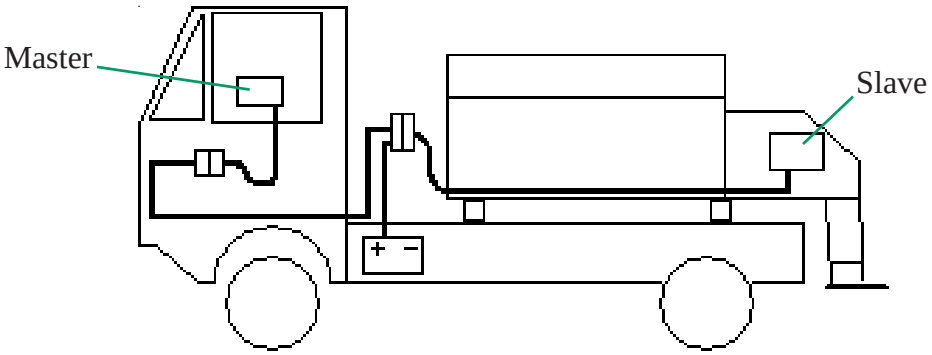
The slave (Version V7)

The slave is the switching electronics at the rear of the spreader. The slave controls all hydraulic valves; furthermore, electric consumers like rotating beacon and working headlights are controlled by the slave.

The electrical supply of the spreader is accomplished by a secured line from the vehicle battery. Together with the control lines of the master, this supply line is connected with the central plug connection behind the driver's cabin and fed to the cable set of the spreader. A cable set is firmly installed at the spreader. After mounting the spreader, this cable set must only be connected at the central plug connection.

If the master should be replaced, no settings are lost as all data is saved in the slave. Thus, it is possible to continue working with the saved data immediately also with a different master.

To operate the master, the spreader must be connected with the central plug connection because the master receives its energy supply and its data via the slave.

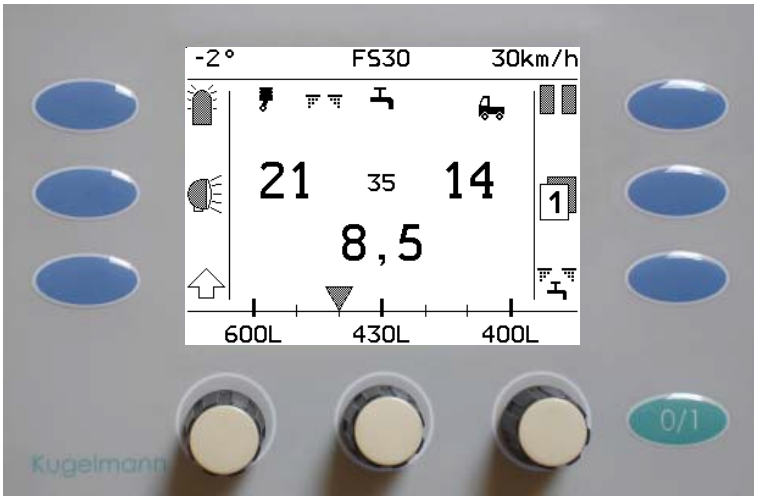


Operating elements of control system k-tronic

Button 1

Button 2

Button 3



Button 4

Button 5

Button 6

Button ON

Left turning knob

Middle turning knob

Right turning knob

English

Button 1 to button 6

Depending on the display, the **buttons 1 to 6** trigger different actions. Description on the following pages.

Button ON

- Switches the spreader on and off.
- The function of this button never changes.

When switching off, all drives are stopped and the rotating beacon as well as the working headlight will be switched off at the control system.

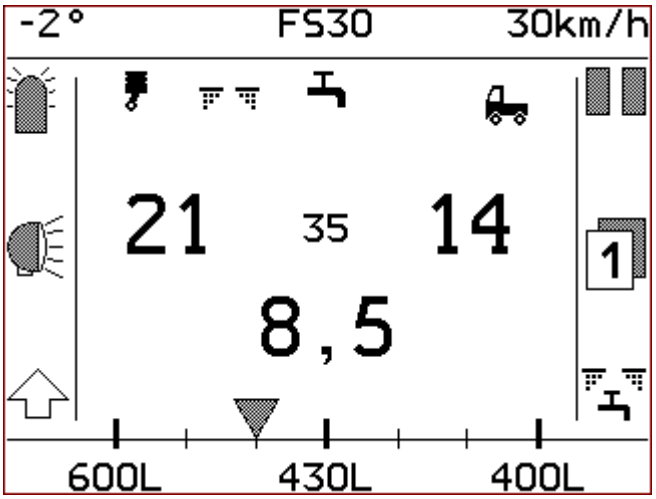
Before the control system is switched on, starting of the vehicle motor is indispensable as the voltage may drop extremely during the starting procedure. If the control system is already switched on, in particular vehicles with a board voltage of 12 Volt recognize this as error “low voltage”.

Turning knob left/middle/right

The turning knobs are provided with a detent mechanism.
Turning from one detent to the next produces a control tone. The control tone may be switched off.

The turning knobs may be pressed and receive a different function. If a turning knob must be pressed to change values, this is specially indicated in the description. A normal change of values is executed in unpressed condition.

Display areas of control system k-tronic



-2° Temperature display (option) (Page 16)

FS30 Percentage of pre-wetted salt **during brine spreading** (Option) (Page 32)

30km/h Vehicle speed (Page 16)

Rotating beacon **on/off** (Page 11)

Motor unit **on/off** (Option)(Page 22, 24)

Electrical spreading control **spreading material yes/no** (Option) (Page 36)

Brine spreading **on/off** (Option) (Page 32, 33)

Spreader works **path-dependent/in manual mode** (Page 20, 21)

Spreader **operating/pause** (page 12, 13)

English

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Working headlight at spreading disc **on/off** (Page 11)

21

Spreading quantity left chamber (Page 15)

35

Sum of spreading quantities (Page 15)

14

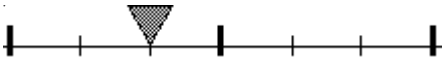
Spreading quantity right chamber (Page 15)

8,5

Spreading width (Page 16)

Operator levels **Level1/Level2** (Option) (Page 14)

Left shift key **not activated/pressed** (Page11, 17)



Electrical adjustment of spreading pattern (option) (Page 26)

Right shift key **spreading button** (Page 14, 26)

600L

Output counter left chamber (option) (Page 34)

430L

Output counter brine tank (option) (Page 35)

400L

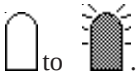
Output counter right chamber (option) (Page 34)

English

Meaning of buttons in operating mode

Button 1 for rotating beacon

Press button 1 to switch on the rotating beacon.

Display changes from  to .

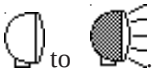
Press button 1 again to switch off the rotating beacon. Display changes

from to .

Button 2 for the working headlight

The working headlight is located at the wing of the spreading disc suspension.

Press button 2 to switch on the working headlight.

Display changes from  to .

Press button 2 again to switch off the working headlight. Display changes

from to .

Button 3 is the left shift key

Various settings concerning the spreading operation are possible by pressing this button. To execute the individual actions, hold button 3 pressed.

Display changes from to .

The functions of buttons 1, 2, 4, 5 and 6 as well as the functions of the turning knobs change (see paragraph left shift key).

By releasing button 3, you exit this special page. Display changes

from to .

Exception: If you press button 6 with button 3 also pressed down, you reach the user menu (see paragraph user menu).

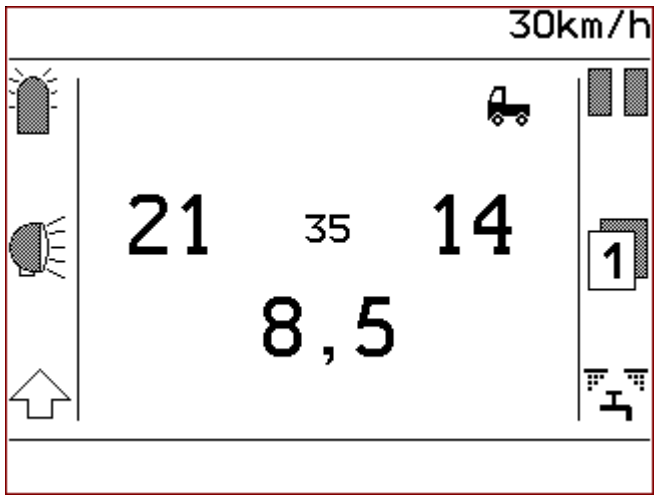
English

Button 4 for spreading/pause

1.) Start spreading

After switching the spreader on with button ON, the spreader is set to “PAUSE”. To start spreading, press button 4 .

Display of button 4 changes from to . The black bar behind the spreading quantities will be deleted and the sum of the spreading quantities 35 will be shown instead of PAUSE .



Display during spreading

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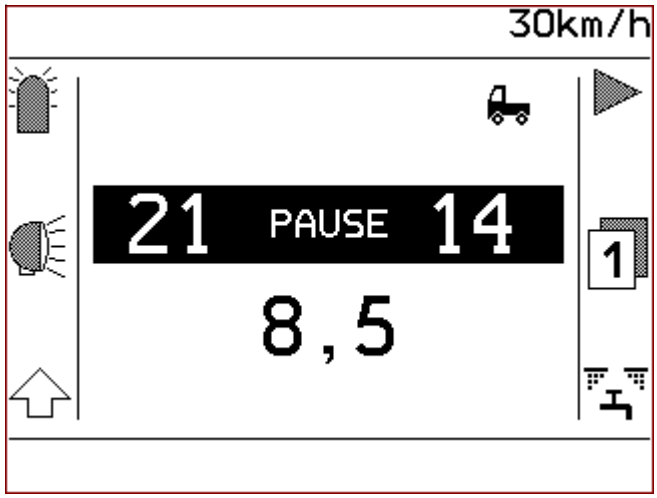
2.) Spreading PAUSE

Press button 4 in order to interrupt spreading for a short time.

Display of button 4 changes from to .

The sum of spreading quantities 35 is replaced by PAUSE and the spreading densities are marked with a dark bar.



Display during PAUSE

Button 5 is the level button

At the control system k-tronic, you have the possibility to deposit 2 different data sets for the user levels and .
To change the user levels, press button 5.

Display changes from to , and vice versa.

After switching on (Button ON), user level 1 **is always set.**

Button 6 is the right shift key

Use the right shift key to set different options concerning spreading operation and spreading materials.

To execute the individual actions, hold button 6 pressed.
The functions of buttons 1, 2, 3, 4 and 5 as well as the functions of the turning knobs change (see paragraph right shift key). Depending on the options of the spreading unit, the displays of the buttons 1, 2, 3, 4 and 5 get new symbols.

By releasing button 6, you exit this special page. The buttons 1, 2, 3, 4, and 5 as well as the turning knobs receive their original functions.

Output rates

The output rates indicate the spreading density in grammes per square metre (g/m²) separately for each chamber.

The output rates for the left and right spreading chamber can be set to different values.
If different spreading materials exist in the chambers, it is possible to set any desired mixing ratio of both spreading materials. The mixing ratio can be adjusted to the respective road conditions at any time, even while driving. As soon as you have set the appropriate mixing ratio for operation, you can lock the chambers against each other (see paragraph “Locking of chambers”).

Output rate for left chamber (21)

The output quantity for the left chamber can be set at the left turning knob.
The increments per turning knob detent as well as the upper and lower limit can be set in the menu.

Output rate for right chamber (14)

The output quantity for the right chamber can be set at the right turning knob.
The increments per turning knob detent as well as the upper and lower limit can be set in the menu.

Sum of output quantities (35)

Display of sum of both chambers in grammes per square metre (g/m²). In case of pre-wetted salt equipment, the proportional weight of brine is included (see paragraph “part of brine”).

Display only during spreading operation. At pause, “PAUSE” is displayed at this point.

When working with locked chambers, the sum of the output quantities is written in large numbers and the output quantities of the left and right chamber is written in small numbers (see paragraph “Locking of chambers”).

For the output quantities of each spreading material, it is possible to set individual values for minimum, maximum and step width per turning knob detent.

English

Spreading width (8,5)

The spreading width is indicated in metres.
Adjustment of spreading width by means of the middle turning knob.
The step width per turning knob detent as well as the upper and lower limit can be set in the menu.

Vehicle speed (30km/h)

The current vehicle speed is displayed. This display is intended for controlling purposes and should indicate the same speed as the speedometer. At first assembly of the spreader, the speed signal is adjusted to the respective vehicle. The adjustment of the speed signal is executed by the distributor or the service personnel.

If the spreader is running in manual mode, the simulation speed set here is displayed.

Temperature display (-2°) (option)

Displayed only if the temperature sensor is part of the spreader equipment. Displayed in °C.

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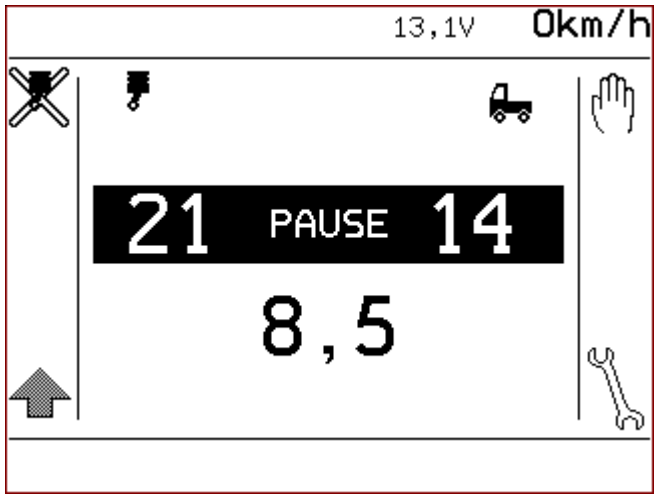
Additional functions of the left shift key

To execute the additional functions, press button 3 and hold it pressed

- Display of button 3 changes from to .
- The respective button with the displayed function must be pressed additionally.

Depending on the spreader options, additional symbols may be displayed; though, these symbols can not be influenced by the left shift key. For example, the display may look like this.



The functions of buttons 1, 4 and 6 change with the left shift key pressed.

Button 1:

Stop/start motor unit (Option) (Page 22) Special equipment

Button 4:

Switching between **Manual operation** and **path-dependence** (Page 19)

Button 6:

Entry into user menu (Page 34)

Buttons 2 and 5 as well turning knobs are not occupied with the left shift key pressed.

When activating the shift key, nominal values are shown instead of actual values. In addition, the measured supply voltage 13,1V is displayed in the upper line.

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Distinction path-dependence and manual operation

Path-dependent spreading

The control system k-tronic calculates the quantity of spreading material for the spreading operation on the basis of the vehicle speed.

Manual operation

During manual operation, the control system k-tronic calculates the quantity of spreading material for the spreading operation by means of the set simulation speed (independently of the actual vehicle speed).

If you switch to spreading operation by means of button 4, spreading starts with manual operation, even if the vehicle is standing still.

Changing between manual operation and path-dependence

1.) Switching from path-dependence to manual operation.

The display shows

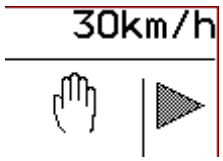
- Hold button 3 pressed the symbol changes to .

Display changes to

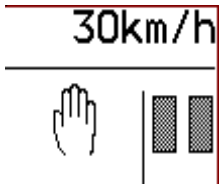
- Press button 4.

Display changes to

- Release button 3.

The display shows 

- Press button 4 to start spreading.

Display changes to 

From now on, the spreader works in manual mode with the set simulation speed of 30km/h

The simulation speed can be set in the user menu. (See paragraph “Setting of simulation speed”).

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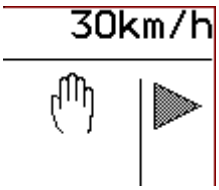
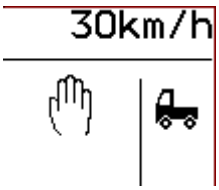
2.) Switching from manual operation to path-dependence.

The display shows 

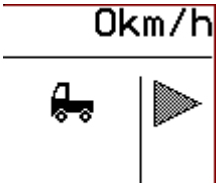
- Hold button 3 pressed the symbol of button 3 changes to .

Display changes to 

- Press button 4.

Display changes to

Release button 3.

Display changes to 

Spreading is path-dependent again. At vehicle standstill, spreading operation is automatically interrupted.

English

Motor unit (Option)

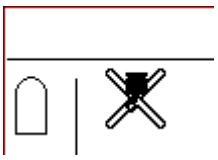
Only spreaders with additional motor unit for hydraulic supply. The operating state of the motor unit is displayed for controlling purposes; the symbols have the following meaning:

= Motor unit running = motor unit not running.

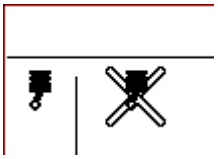
A: Motor unit - petrol

1.) Starting the motor unit - petrol

The ignition at the motor unit must be switched on.

The display shows 

- Hold button 3 pressed the symbol changes to .

Display changes to 

- Press button 1, short tipping is enough because the starting pulse is extended to the necessary period. As soon as the motor unit starts, the

Display changes to

- Release button 3.

The display shows

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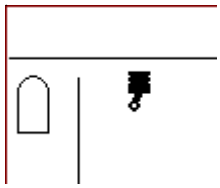
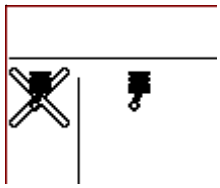
If, contrary to expectations, the motor unit should not start, it is possible that the ignition at the petrol motor unit is not switched on.

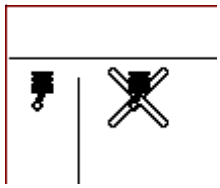
2.) Switching off the motor unit

The display shows 

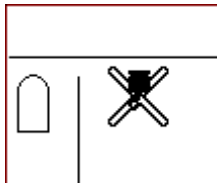
- Push button 3 and hold it pressed down, the symbol changes to .

Display changes to 

- Push button 1, short tipping is enough to switch off the motor unit.

Display changes to 

- Release button 3.

The display shows 

If, contrary to expectations, the motor unit stops during driving, the display changes from to .

Please do not forget to switch off ignition after operation; otherwise, the starter battery of the motor unit may be empty next time the motor should be started.

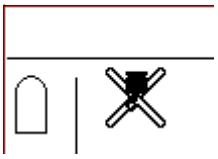
English

B: Motor unit - diesel

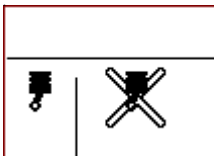
1.) Starting of diesel unit

= Motor unit running = motor unit not running. = Preheating of diesel unit

For remote service of the diesel unit via the control system k-tronic, the key switch at the operating unit of the diesel unit must be set to “0”.

The display shows 

-Hold button 3 pressed, the symbol of button 3 changes to .

Display changes to 

- Press button 1. Short tipping is enough, because the starting pulse is saved in the control system. Release button 3. Preheating of engine is indicated. Depending on temperature, this procedure may take up to 15 seconds.

The display indicates

- As soon as the diesel unit has started, the preheating light goes out.

Display changes to

If, contrary to expectations, the diesel unit should not start, it is possible that the ignition at the diesel unit is switched on. If the diesel unit has been started via the key switch at the unit, it is not possible to control it via the control system k-tronic.

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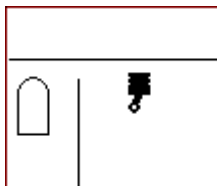
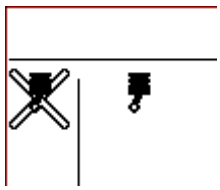
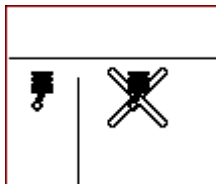
2.) Switching off the diesel unit

The display shows 

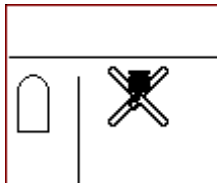
- Hold button 3 pressed, the symbol changes to .

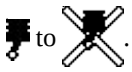
Display changes to 

- Push button 1, short tipping is enough to switch off the motor unit.

Display changes to 

- Release button 3.

The display shows 

If, contrary to expectations, the motor unit stops during driving, the display changes from  to .

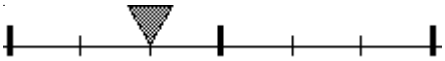
English

Electrical adjustment of spreading pattern (option)

- To adjust the spreading pattern, please press the middle turning knob
- and press the turning knob in pressed down position.

The symbol shows the displacement of the spreading image position.

By turning the pressed turning knob clockwise, the spreading image is displaced to the right side seen from direction of travel. A turning movement anti-clockwise displaces the spreading image to the left side.

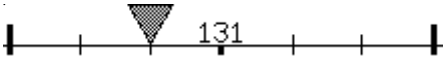
 Spreading image position

If the set position of the spreading pattern adjustment is changed, the new position is only reached during spreading. During operating status PAUSE , the spreading pattern adjustment does not change its position.

For each operator level, or it is possible to set a different position for the electrical adjustment of the spreading pattern. During level change, the set value is adopted to the level memory. The set value is assigned to the currently set user level.

During first assembly, fixed values are determined and saved for the left, middle and right point. Smaller or larger steps can be defined for the displacement of the spreading pattern to the left side compared to the displacement to the right side. The two positions lying in between are calculated from these saved values.

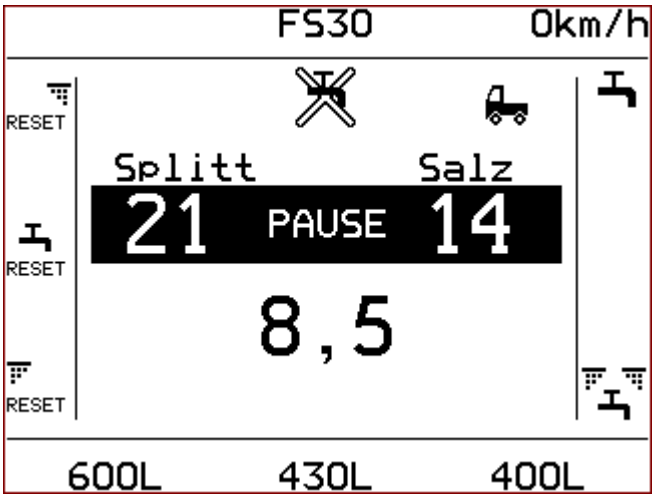
If the left shift key is pressed, the actual value for the adjustment of the spreading pattern appears in the middle of the spreading pattern display.



Theoretically, the actual value of the spreading pattern position can take values between 0 and 255. With a small value, the position of the spreading image is displaced to the left side. With a large value, the position of the spreading image is displaced to the right side. The actual values are limited by the mechanical limits of the spreading image adjustment

English

Additional functions when pressing right shift key or spreading material button



The symbols for a reset of the output counter do only appear at spreaders with output counters. The symbol for brine spreading does only appear at spreaders with additional equipment pre-wetted salt.

	Hold right shift key pressed
RESET	Reset output counter right chamber (Page 35)
400L	Output counter right chamber (Page 35)
RESET	Reset output counter brine tank (Page 35)
430L	Output counter for brine tank (Page 35)

English

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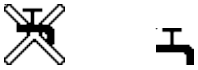
RESET — Reset output counter left chamber (Page 34)

600L — Output counter left chamber (Page 34)

 — Brine spreading **off/on** (Page 32)

Splitt — Spreading material left chamber (Page 30)

Salz — Spreading material right chamber (Page 20)

Setting of spreading materials for the individual chambers

Assignment of spreading material for left chamber

The set spreading material for the left chamber appears over the spreading density of the left chamber

The display shows

- Keep right shift key pressed.

On the display, the set spreading material appears

Turn the left turning knob until the desired spreading material is set (e.g. salt).

On the display, the new spreading material appears

- Release button 6

The spreading material name is hidden on the display.

The new spreading material with all stored data remains saved in the set user level.

Assignment of spreading material for right chamber

The set spreading material for the right chamber appears over the spreading density of the right chamber

The display shows

- Keep right shift key pressed.

On the display, the set spreading material appears

English

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- Turn the right turning knob until the desired spreading material is set (e.g. salt).

On the display, the new spreading material appears

- Release button 6

The spreading material name is hidden on the display.

The new spreading material with all stored data remains saved in the set user level.

Only spreading materials approved (✓) under menu point “spreading materials” at the service menu can be selected. The following spreading materials can be selected:

- **Salt**
- **Refined salt**
- **Grit**
- **Sawdust**
- **Special1**
- **Special2**

If a different spreading material is selected for a chamber, this selection must be assigned to both user levels (1 and 2). The setting is always assigned to the level currently set at the user display.

An automatic transfer of the spreading material selection to the other user level is not executed.

The names of the spreading materials may also be displayed permanently, please see options in the detail menu to set this.

English

Spreading units with pre-wetted salt equipment (option)

Part of brine in case of pre-wetted salt equipment FS30

With brine switched on, this indicates the percentage of brine based on the total output.

Example:
Sum spreading density: 20 gr/m², FS30 means thus 6 grammes brine per m² and 14 grammes salt per m².

To change the part of brine, press button 6 , press it down and set the percentage of brine by means of the middle turning knob.

You have the possibility to set a different value for the part of brine for each user level and .

Activate brine

The display shows

Keep right shift key (button 6) pressed.

Display changes to

- Press button 4.

Display changes to

Release right shift key (Button 6).

English

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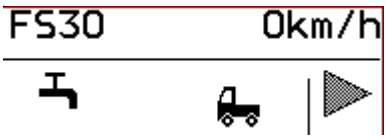
Display changes to 

Deactivate brine

The display shows

Keep right shift key (button 6) pressed.

Display changes to

- Press button 4.

Display changes to

Release right shift key (Button 6).

Display changes to

Decide for each user level whether brine should be activated or not. Activation/deactivation is assigned to the currently set user level or .

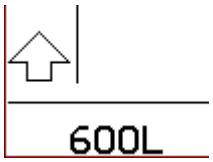
If the left shift key is pressed, the actual value for the brine part in relation to the total output appears on top in the middle.

Output counter (option)

At the control system k-tronic, you can display the output counters for the left and right chamber. An additional output counter is available with the option brine equipment.
Similar to a trip meter at a vehicle, the output counters can be reset to 0. The output counters can be set to the unit litre or kilogram or without units. This ensures simple control of the quantity of spread material.

Output counter left chamber
Reset of output counter of left chamber

The display shows

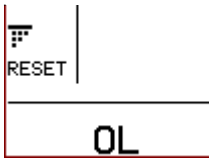


- Keep right shift key (button 6) pressed.

Display changes to

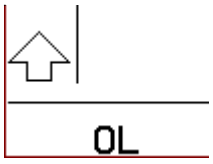
- Then, press button 3 RESET for a short time to set the counter reading to 0L .

Display changes to



- Release right shift key (Button 6).

Display changes to



English

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Output counter right chamber,
Reset of output counter of right chamber

The display shows

- Keep right shift key (button 6) pressed.

Display changes to

- Then, press button 1

for a short time to set the counter reading to 0L.

Display changes to

- Release right shift key (button 6).

Display changes to

Output counter for brine tank (only with option brine equipment), resetting output counter of left chamber

- Keep right shift key (button 6) pressed.

- Then, press button 2 additionally

to reset the counter reading to 0L .

- Now, release right shift key (Button 6).

English

Electrical spreading control (option)

The electrical spreading control monitors whether spreading material is spread by means of rotation of the spreading disc.

If the operator display shows a symbol, spreading material leaves the rotating spreading disc.

If a can be seen on the display, no spreading material is spread.

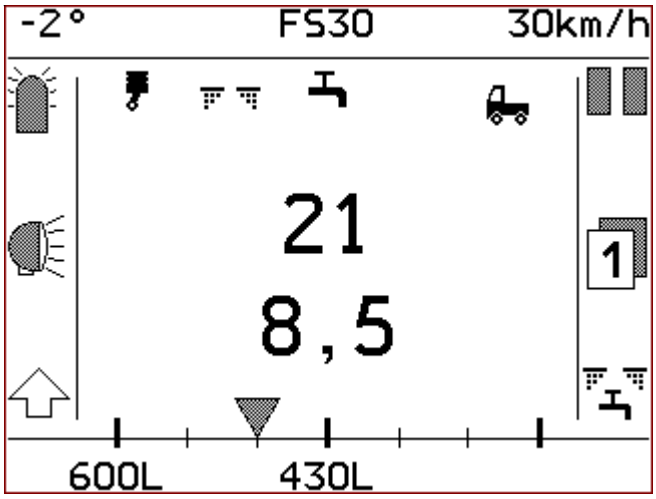
The electrical spreading control does not show whether one of the chambers for spreading material is empty.

Double dosing (Option)

With double dosing, the dosing of spreading material is controlled separately for each screw. If the screw drives are mechanically connected, double dosing must be switched off.

If double dosing is not active, the output quantity is adjusted by means of the left and right turning knob.

All settings which have to be made for both screws in case of double dosing, are made only for one dosing unit if double dosing is switched off.



Main display without double dosing

21	Output quantity dosing
600L	Output counter dosing (option)
430L	Output counter brine tank (option)

English

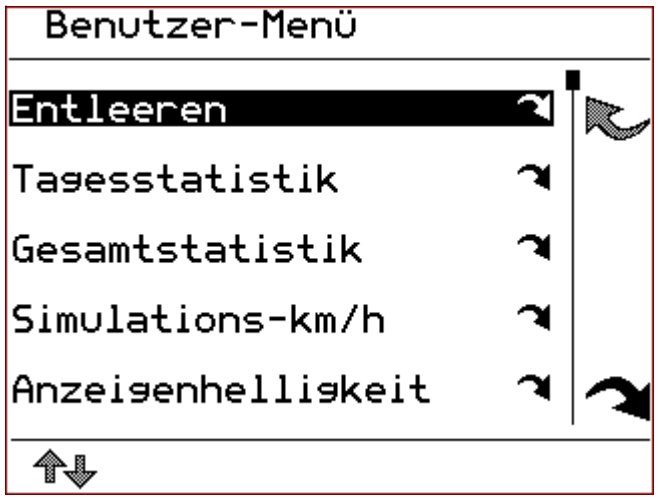
User menu

The user menu contains all important settings which must be reached quickly by the operating personnel.

For safety reasons, the control system k-tronic activates the operating state PAUSE when calling up the user menu.

To reach the user menu

- keep the left shift key pressed,
- the display of the button changes to
- now, press button 6 ,
- then, release the buttons.



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Menu operation

- exit the menu with button 4 on the top right, you get back to the user interface

- with the left turning knob you reach the individual menu points,
- the menu line currently chosen is highlighted in dark color and written bright on dark

- if a setup screen or a “deeper” menu point is attached to the menu point, this is shown by means of a small arrow at the end of the line; press button 6 to reach it.

Soft switch

A soft switch is a simple switching option within a menu point. If the menu point is connected to a soft switch, you can change the setting by means of button 5.

Activate button 5 for switching ON -
or

lock button 5 for switching OFF.
- the current switching state is displayed in the corresponding menu line with small symbols.
- for switched on - activated,
- for switched off – locked.

Setup screens

In the setup screens, values can be modified in the currently valid areas. The setup screen page is built up in 3 columns. Up to 3 values can be set per setup screen.

You reach the setup screens as follows:

- The setup screen is built up after pressing button 6 .

The values can be modified by means of the underlying turning knobs. The set values are saved immediately.

- the left turning knob for the left value
- the middle turning knob for the middle value and
- the right turning knob for the right value

Exit the setup screen with button 4 .

The user menu contains the following menu points

Emptying

The left and right chamber as well as the brine tank can be emptied by means of this setup screen.

Daily statistics

Statistics on the spread quantities, time and distance. This list can be reset by the operator.

Complete statistics

Statistics on the total spread quantities, total time and distance. It is not possible to reset these statistics.

Simulation speed km/h

The speed for manual operation can be set in this setup screen.

Display brightness

Definition of brightness of display and button lighting.

Key tone ON

The key tone and the turning knob tone can be switched off by means of this soft switch.

Show output counter (option)

This soft switch sets whether the output counter readings (option) are shown. This menu line is displayed only at spreaders with equipment output counter.

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Language: D-GB-F-I

Four languages are available:

- German
- English
- French
- Italian

Details menu

All details of the user interface and the spreader are set here. These settings must only be executed by trained personnel.

Description of user menu points

Emptying

The left and right chamber as well as the optional brine tank can be emptied by means of this setup screen.

Proceed as follows to get to the setup screen “Emptying”:

- Turn the left turning knob until the line is highlighted in dark color (1st line in user menu)

- Press button 6 .

The setup screen for emptying is built up.

Setting of speed for emptying the individual chambers with the turning knobs below.

- Left turning knob for left spreading chamber
- Right turning knob for right spreading chamber
- Middle turning knob for optional brine tank

If a value larger than 0 is set, the individual drives begin to run.

Stop By pressing a turning knob, all drives stop immediately, the displays reset to 0.

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Exit “emptying” by pressing button 4 .

When exiting setup screen “Emptying”, all drives stop immediately.

Chambers filled with salt or refined salt, must be emptied before a longer operating pause, as salt clumps within few days because of humidity. There is danger of “tunneling”, i.e. salt is spread only until the screw channel is empty, because no more salt is provided from the chambers.

Daily statistics

You get to the daily statistics via the user menu.

The menu line with the entry “Daily statistics” must be chosen by the left turning knob , the menu line will be highlighted in dark color.

By pressing button 6 the page with the daily statistics will be displayed.

The daily statistics can be reset by the user by means of button 1; all entries of the daily statistics will be deleted.

Exit the daily statistics with button 4 without deleting values.

Complete statistics

The complete statistics indicate the total quantity and counter readings of the spreader, it can not be reset. You get to the complete statistics via the user menu.

The menu line with the entry “Complete statistics” must be chosen by the left turning knob , the menu line will be highlighted in dark color.

By pressing button 6 , the page with the complete statistics is displayed.

By pressing button 4 , you exit complete statistics.

Simulation speed km/h

Set the speed for manual operation in this setup screen. To validate the new settings,

the symbol must appear at the operator display. Then, the spreader works independently of the speed signal. Change the value for simulation speed in the setup screen with the middle turning knob.

Key tone ON

This soft switch sets whether the push of a button and the activation of the turning knob are confirmed by a signal tone.

- if a ✕ appears next to button 5, the tone may be switched off.

- if a ✓ appears next to button 5, the tone may be switched on.

For controlling purposes, the current switching state for the key tone is displayed in the menu line.

- ✓ tone switched on,
- ✕ tone switched off.

Show output counter (option)

This soft switch sets whether the output counter readings (option) should be displayed at the operator display.

- if a ✓ appears next to button 5, the output counters can be shown.

- if a ✕ appears next to button 5, the output counters can be hidden by the push of a button. For controlling purposes, the current switching state for the display of output counters is displayed in the menu line.

- ✓ Output counter readings are shown

- ✕ Output counter readings are not shown.

This menu point is only displayed for spreaders with output counters available.

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Language: D-GB-F-I

Setting of display language in this setup screen.

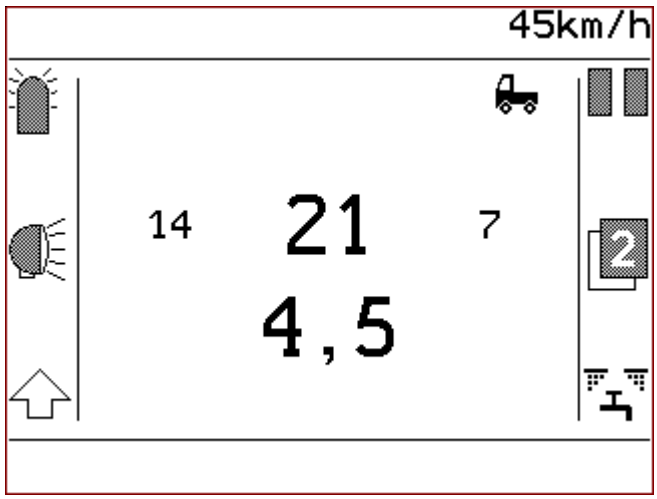
The following languages can be chosen: German, English, French and Italian.

Selection by turning the middle turning knob.

Working with locked chambers

If the same spreading material is set for the left and right chamber, and with automatic locking activated, both chambers are locked with each other.

Use the left or right turning knob to change the spreading quantity of both chambers at the same time. This means that the total quantity is drawn evenly from both chambers. If a partition wall is available, the total quantity is spread according to the proportion of the chambers.



Display with locked chambers during spreading operation

If the chambers are locked with each other, the sum of the output quantities is written in large numbers and the output quantities of the left and right chamber are written in small numbers.

During a spreading pause, the display of the individual chambers changes to “PAUSE”.

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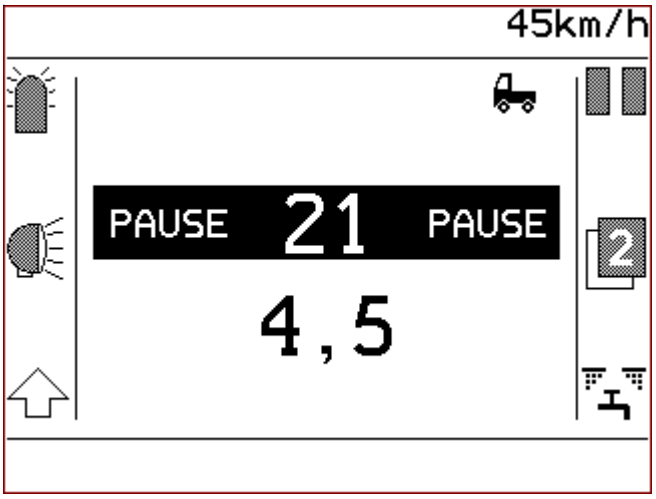


Display with chambers locked and PAUSE

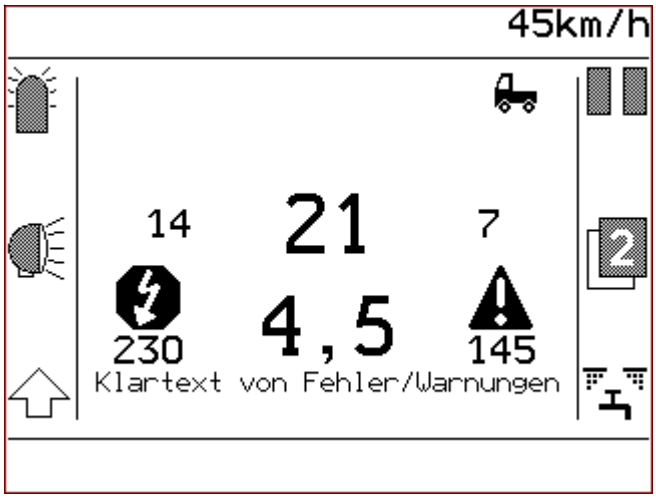
The locking of chambers as well as the relation of chambers are the same

for both user levels 1 or 2 .

During locking, the values of the output quantities minimum, maximum and step per turning knob detent - are adopted from the set spreading material. During locking, these values relate to the sum and not to the single chambers.

These settings are made in the details menu by the distributor.

Display of errors and warnings



Display of errors

If the control system detects an error, is shown, below, the error number 230 is shown and the error is written on the display in clear text. Additionally, a continuous signal tone is emitted.

Display of warnings

If the control system detects an operating state meaning a warning, is shown and the number of the warning 145 is shown. If no error is active at the same time at the warning display, the warning is written in clear text at the display and 3 short signal tones are emitted.

The signal tone can be stopped by shortly pushing button 3 or button 6 or by means of one of the 3 turning knobs. If a new error or warning is detected, a new signal tone is emitted.

As soon as the error or the warning is removed, the error message or the warning expires.

Display of actual values during spreading operation

Press the left shift key to display the actual value of the spreading operation.

The following values are displayed:

- Spreading density left and right
- Sum of spreading densities
- Spreading width
- Measured supply voltage
- Position of spreading pattern adjustment (only with option electrical spreading pattern adjustment)
- Brine part with pre-wetted salt equipment (only with option pre-wetted salt equipment)

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*

kugelmann Maschinenbau is a family-run Allgäu business with its main emphasis and tradition in municipal technology. With passion, we manufacture reliable and pioneering machines - we love what we do.