kugelmann*

MCSS - 5

Control system

Art.Nr.: 10047441

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*
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We are constantly developing our products to offer our customers maximum convenience. Therefore, we ask for your understanding that the manual can deviate from the product in some regards.

2 Content

3 General information

This chapter gives you information on the following:

- Chapter *3.1 "Service information", page 5*
- Chapter *3.2 "EC Declaration of Conformity", page 6*

3.1 Service information

Customer service:

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3.2 EC Declaration of Conformity

in terms of the EC Machinery Directive 2006/42/EC and

the EMC Directive 2014/30/EU

We herewith declare that the control system designated below complies with the relevant essential health and safety requirements of the respective EC Machine Directives and the EMC Directive due to its design and construction, and in the version supplied by us.

If the control system is modified without our consent, this declaration shall cease to apply.

Designation: Control system MCSS-5

Relevant EC machinery directives:

DIN EN ISO 15431 / 16330/292-1 / 292-2 / 60204-1 / 12100 / 13849-1 / 13849-2

Rettenbach a.A., December 2018 Josef Kugelmann

4 Introduction

This chapter gives you information on the following:

4.1 Target group

These operating instructions are intended for skilled persons who are responsible for the following work at the control system:

- Commissioning
- Control system
- Operation
- Use

At least once a year, all personnel must be trained in the operation of the control system in accordance with the guidelines of the business liability insurance. The use of the control system by untrained or unauthorized persons is prohibited.

4.2 Use

These operating instructions contain all necessary data and information for safe operation and commissioning of the spreader.

Make sure that all persons responsible for the operation of the control system or persons working in the immediate environment of the control system are familiar with the operating instructions as well as the safety information in this manual.

These operating instructions are part of the product and have to be kept in a safe place. In case of resale or transfer of the control system to third parties, these operating instructions have to be included.

All information, illustrations and technical data correspond to the technical state at the time of printing. Subject to technical modifications.

4.3 Conventions used

This manual uses the following typographic conventions:

Symbol	Signal word	Meaning
	Danger	Indicates an imminent dangerous situation, which - in case of non-observance of the safety instructions - will entail death or grievous bodily harm.
	Warning	Indicates a possibly dangerous situation, which - in case of non-observance of the safety instructions - may entail death or grievous bodily harm.
	Caution	Indicates a possibly dangerous situation, which - in case of non-observance of the safety instructions - may result in minor injuries or damage to property.
	Notice	Contains useful information with respect to proper handling of the machine.

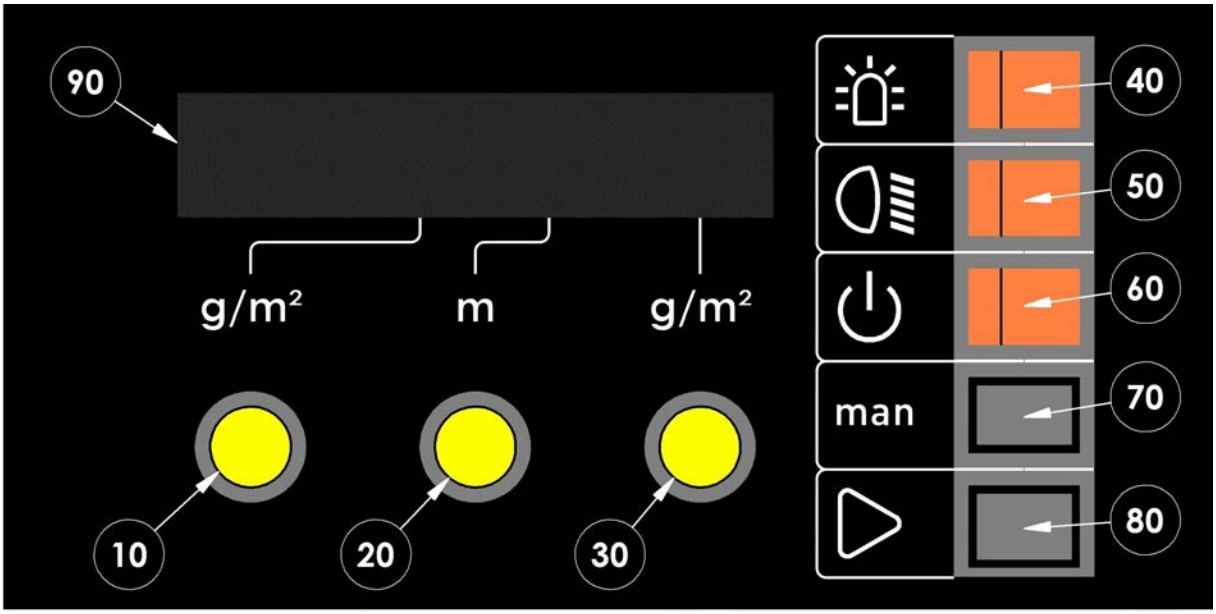
4.4 Change history

Date	Version	Modification
March 3, 2018	1.1	First edition

5 General description

This chapter gives you information on the following:

5.1 User interface



Pos. No.	Pictogram	Function
10		Turning knob to set spreading density left screw [g/m²] See Chapter *8.5 "Setting of spreading density", page 48*
20		Turning knob to set spreading width [m] See Chapter *8.4 "Setting of spreading width", page 47*
30		Turning knob to set spreading density right screw [g/m²] See Chapter *8.5 "Setting of spreading density", page 48*
40		Rotating beacon See Chapter *8.1 "Switch on/off rotating beacon", page 43*
50		Working headlight See Chapter *8.2 "Switch on/off working headlights", page 43*
60		ON / OFF See Chapter *7.2 "Switch on / off control system", page 23*
70	man	Manual operation / path-dependence See Chapter *8.3 "Path-dependence and manual operation", page 45*
80		START / PAUSE See Chapter *8.6 "Start spreading", page 49*
90		Display

5.2 Designated use

Use the control system only for spreaders manufactured by Kugelmann Maschinenbau e.K.

Use the control system only with the plug-and-socket connections provided for this purpose and with the respective original cables.

Any kind of use that deviates from the procedure set forth herein is considered contrary to its designated use. The operator of the control system is liable for any damages arising from such action.

Use and reconditioning of the control system may only be carried out by trained and competent personnel.

To operate the equipment within the limits of its designated use, please note the following:

- These operating instructions as well as all other enclosed documentation.
- The relevant accident prevention regulations.
- The generally recognized rules relating to technical safety requirements and occupational health.
- The operating instructions of the carrier vehicle.

5.3 Obvious misuse

It is not allowed to operate machines with the control system which were not designed and manufactured by Kugelmann Maschinenbau e.K.

Do not use or store the control system outside or uncovered.

The control system shall not be used as handle.

5.4 Wear parts

Hinweis

Wear parts are:

- Foil stickers
- Rocker switches
- Turning knobs
- Push-buttons
- Lighting
- Connectors

6 Safety instructions

This chapter gives you information on the following:

6.1 General safety instructions

Warning

Use of the control system by untrained persons.

Risk of serious injury.

- Make sure that all persons responsible for the operation of the control system are trained in the operation of the device and are familiar with the operating instructions as well as the safety information in this manual!
- Insist on compliance with the applicable safety regulations!

Warning

Non-observance of guidelines.

Risk of serious injury or death.

- Please observe the regulations relating to accident prevention!
- Please observe the generally applicable safety regulations, industrial standards and medical guidelines!
- Please observe the road transport guidelines!
- Please pay attention to the general advice in these operating instructions!

Caution

Changes at the control system.

Impairment of functionality and danger of property damage.

- Do not make any changes at the control system!

6.2 Commissioning

Caution

First commissioning without instruction.

Risk of injury or property damage.

- First commissioning of the control system must be accomplished by employees of the dealer, the manufacturer or a representative of our works!

Caution

Wrong polarity.

Danger of property damage.

- Check the polarity prior to commissioning!

Caution

Damaged cables.

Risk of injury or property damage.

- Damaged cables have to be replaced immediately!

Caution

Commissioning without making sure that the machine is in perfect technical condition.

Risk of injury or property damage.

- Check all important parts before commissioning!
- Check all safety-related protection devices before commissioning!
- If applicable, please replace damaged parts!

Caution

Improper fixing of control system.

Danger of property damage.

- Make sure that the control system is fixed at an appropriate place designated for this purpose!

Caution

Sensor too close to the sensor disc.

Danger of property damage.

- Start measurement with sufficient safety distance with regard to the sensor disc!

Caution

Laying cables.

Danger of property damage.

- Lay the cable over the pivot of the cabin in order to avoid damage during tilting!

Caution

Connecting to power supply.

Danger of property damage.

- Please make sure that, in the positive cable, a fuse is attached as close to the battery as possible (max. 15 A)!

6.3 Use

Caution

Non-observance of regulations concerning road safety.

Risk of injury or property damage.

- Please make sure that the control system complies with the regulations concerning road safety!

Caution

Operating the spreader in the event of malfunctions.

Risk of injury or property damage.

- In the event of malfunction, stop the control system and switch it off!
- Resolve the error immediately or ask a workshop!

6.4 Maintenance

Warning

Electric shocks during maintenance work.

Risk of serious injury and death.

- Interrupt power supply before executing work at an electrical device!

Caution

Non-observance of safety regulations.

Risk of injury or property damage.

- Comply with the safety regulations during all maintenance work!

Caution

Use of wrong spare parts.

Risk of injury or property damage.

- Do only use original parts for repair work!

Caution

Maintenance work without necessary technical knowledge or appropriate tooling.

Risk of injury or property damage.

- Only carry out maintenance work if you have the necessary expertise as well as suitable tools!

Caution

Cleaning with high-pressure cleaner.

Danger of property damage.

- Cleaning of bearings, plastic parts, electronic parts and hydraulic lines only with low pressure!

Caution

Cleaning of metallic surfaces.

Risk of material damage due to detergents.

- Do not use aggressive detergents!

Caution

Loose cable / screw connections.

Danger of property damage.

- Retighten loose bolted connections and screw connections after repair and maintenance work!

6.5 Designations

Marking	Explanation
CE	Basis for Declaration of Conformity

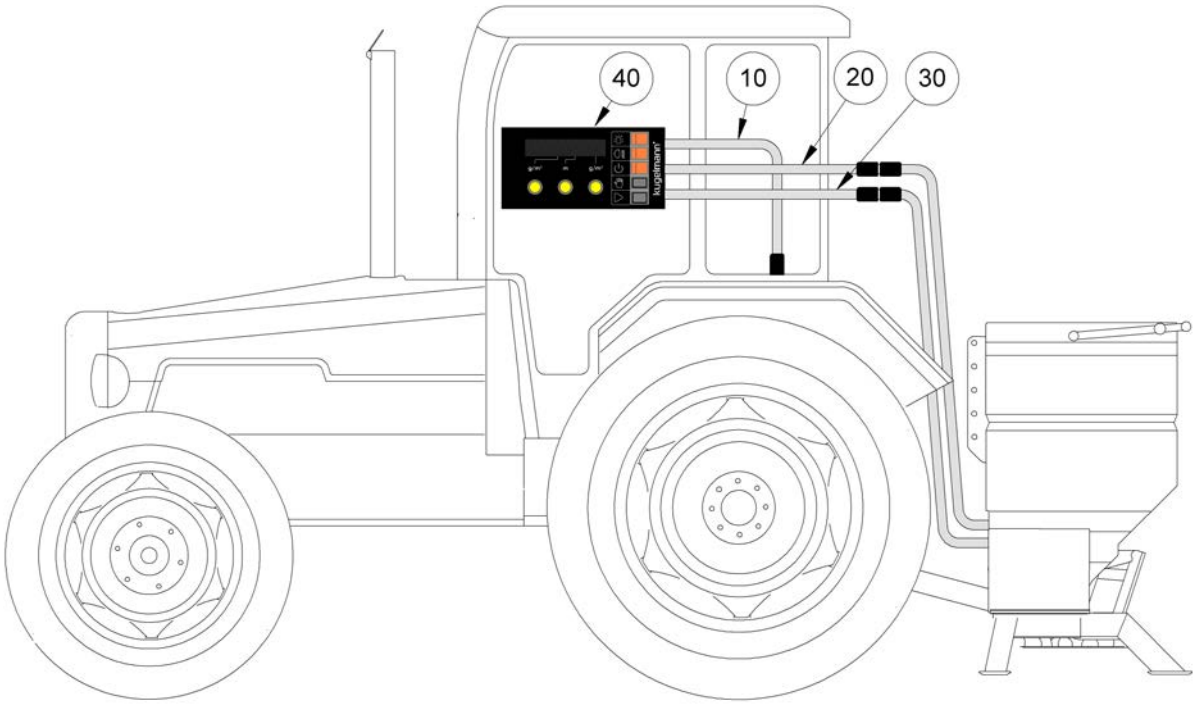
7 Commissioning

This chapter gives you information on the following:

7.1 Wiring diagram

This chapter gives you information on the following:

7.1.1 Cable harness overhung installation



Pos. No.	Function
10	Drive signal / power supply from carrier vehicle to operating unit (Pos. 40)
20	Connecting cable to spreader (valves -> yellow marking)
30	Connecting cable to spreader (sensors -> blue marking)
40	Control system MCSS-5

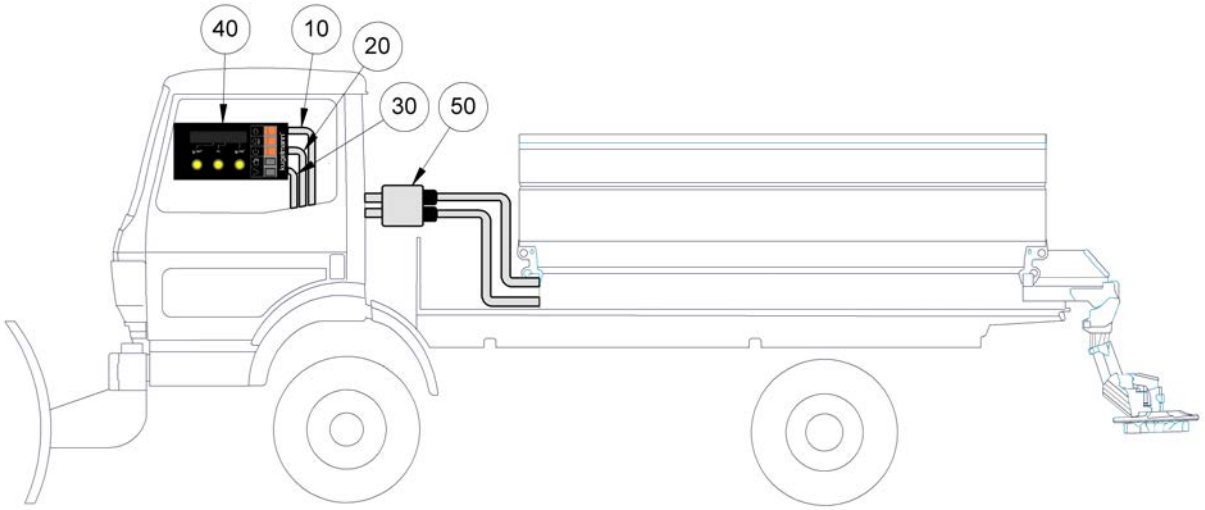
1 Fit operating unit (Pos. 40) at appropriate place in the carrier vehicle.

2 Take drive signal / power supply (Pos. 10) from the carrier vehicle.
- Red = +12 V / socket contact no. 1
- Brown = 0 V (ground) / socket contact no. 2
- Red/white = drive signal (speed signal) / socket contact no. 3

3 Connect connecting cable (Pos. 20) with the spreader.

4 Connect connecting cable (Pos. 30) with the spreader.

7.1.2 Cable harness fixed installation



Pos. No.	Function
10	Drive signal / power supply from carrier vehicle to operating unit (Pos. 40)
20	Connecting cable to spreader (valves -> yellow marking)
30	Connecting cable to spreader (sensors -> blue marking)
40	Control system MCSS-5
50	Connection box

1 Fit operating unit (Pos. 40) at appropriate place in the carrier vehicle.

2 Fit connection box (Pos. 50) at an appropriate place outside the cabin (ideally close to the hydraulic connectors).

3 Fix both junction boxes at an appropriate place in the cabin of the carrier vehicle (ideally next to the control system (Pos. 40)).

4 Lay cables in the carrier vehicle to the junction boxes and connect them with the boxes.

Caution

Laying of cable.

Danger of property damage.

- Lay the cable over the pivot of the cabin in order to avoid damage during tilting!

Hinweis

The terminal diagram is located in the connection box (Pos. 50).

5 Connect connecting cable (Pos. 20) with the spreader.

6 Connect connecting cable (Pos. 30) with the spreader.

7 Take drive signal / power supply (Pos. 10) from the carrier vehicle.

- Red = +12 V / socket contact no. 1
- Brown = 0 V (ground) / socket contact no. 2
- Red/white = drive signal (speed signal) / socket contact no. 3

Caution

Connecting to power supply.

Danger of property damage.

- Please make sure that, in the positive cable, a fuse is attached as close to the battery as possible (max. 15 A)!

8 Plug in the connecting cables (Pos. 10, 20, 30) at the junction boxes in the cabin.

9 Connect the connecting cables of the spreader at the connecting box (Pos. 50).

Caution

First commissioning without instruction.

Risk of injury or property damage.

- First commissioning of the control system must be accomplished by employees of the dealer, the manufacturer or a representative of our works!

Caution

Wrong polarity.

Danger of property damage.

- Check the polarity prior to commissioning!

Caution

Damaged power lines.

Risk of injury or property damage.

- Damaged power lines have to be replaced immediately!

Caution

Commissioning without making sure that the machine is in perfect technical condition.

Risk of injury or property damage.

- Check all important parts before commissioning!
- Check all safety-related protection devices before commissioning!
- If applicable, please replace damaged parts!

Caution

Improper fixing of control system.

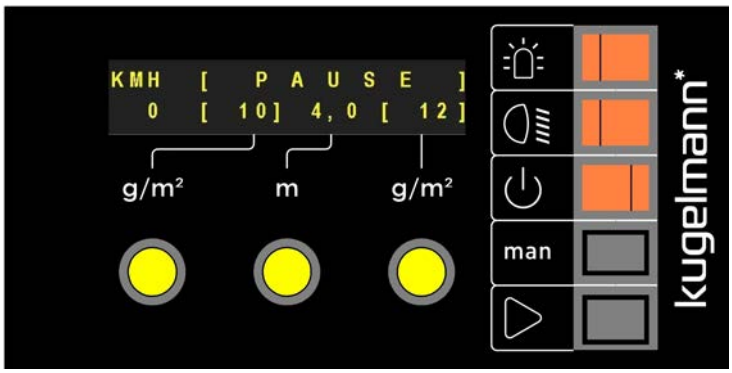
Danger of property damage.

- Make sure that the control system is fixed at an appropriate place designated for this purpose!

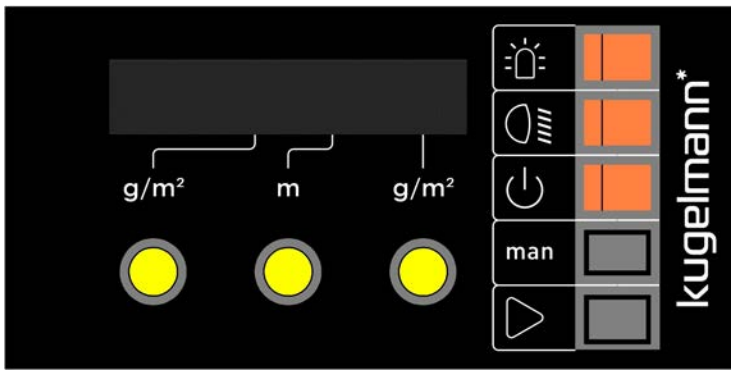
7.2 Switch on / off control system

Actuate toggle switch ON / OFF.

Control system ON. ⇨



Control system OFF. ⇨



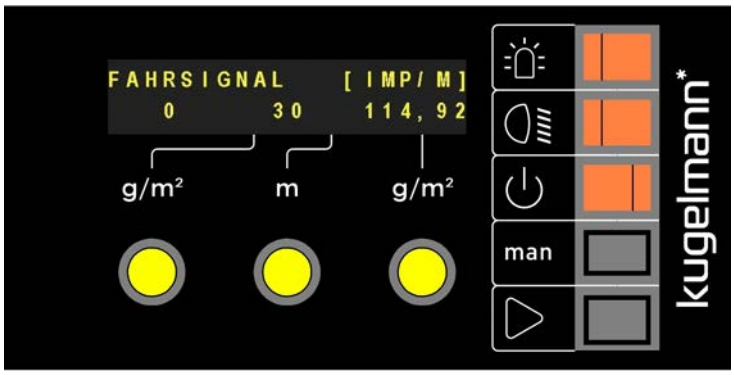
7.3 Open menu

The control system must be switched off!

1 man — Manual operation / path-dependence - press button and hold it pressed.

2  — Actuate rocket switch ON / OFF.

Menu starts ⇨



3 man — Manual operation / path-dependence - release button.

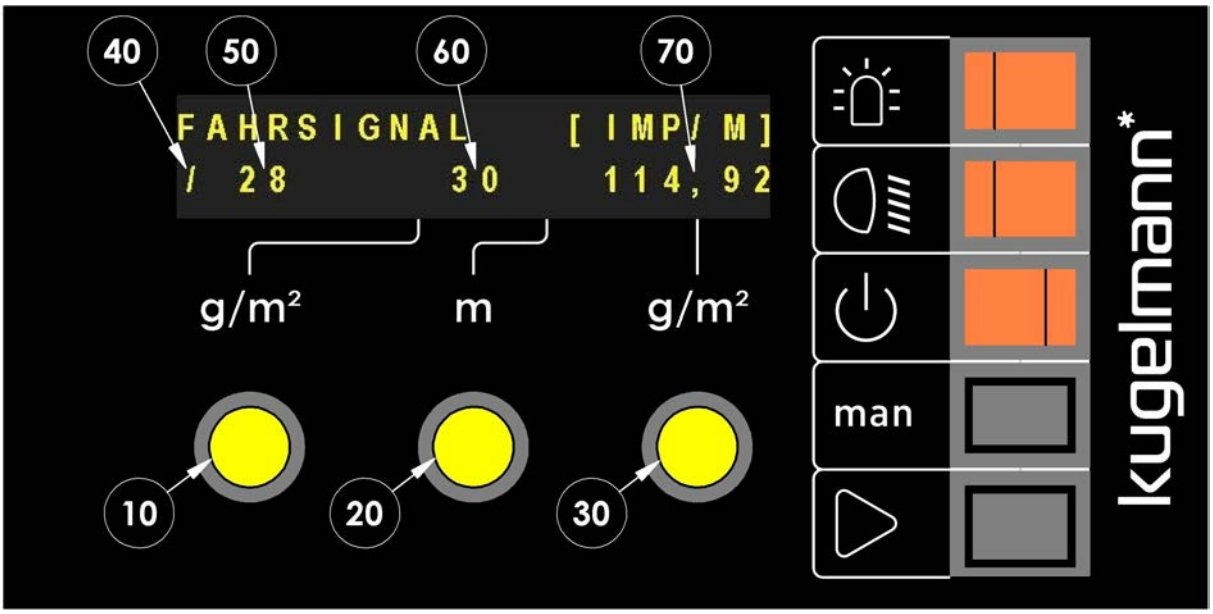
7.4 Configuration of drive signal

The drive signal has to be configured before the control system is put into operation:

Hinweis

For the correct configuration of the drive signal, the carrier vehicle must fulfill the following conditions:

- The drive signal must have been taken correctly from the carrier vehicle
- Square wave signal
- Pulse-Pause 20, ..., 80 %
- min. 4 imp/m
- Voltage swing min. 4 V
- max. 1kHz



Pos. No.	Function
10	Turning knob to actuate the current speed of the carrier vehicle
20	Turning knob to set the speed to be taught
30	Setting of pulses per minute
40	Drive signal
50	Current driving speed of carrier vehicle
60	Speed to be taught
70	Current number of pulses per minute

1 Open menu (see Chapter *7.3 "Open menu", page 24*).

2 By turning the middle turning knob (Pos. 20), choose the desired speed (Pos. 60) for teach-in (10, …., 50 km/h).

3 Start driving until the speedometer of the carrier vehicle shows the set speed (Pos. 60) (In example: 30 km/h).

4 Turning knob (Pos. 10) **press briefly** for confirmation.

Hinweis

Check:

- Compare speed to be taught (Pos. 60) with current driving speed (Pos. 50) and the speedometer of the carrier vehicle.

7.5 Simulation speed

The simulation speed serves for stationary spreading tests and for manual operation.

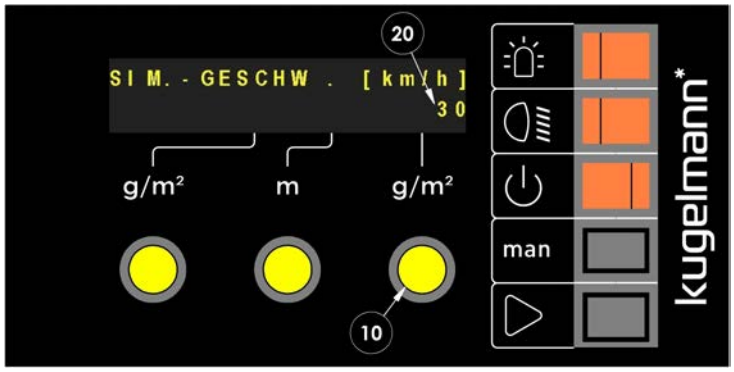
There are two ways to set the simulation speed.

1st possibility:

1 Open menu (see Chapter *7.3 "Open menu", page 24*).

2 man Actuate once.

⇨



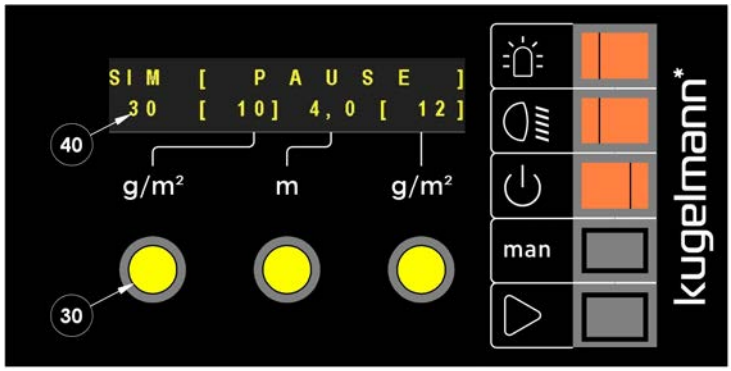
3 By turning the right-hand turning knob (Pos. 10), the set simulation speed (Pos. 20) can be changed.

2nd possibility

1 Switch on control system (see Chapter *7.2 "Switch on / off control system", page 23*)

2 Briefly press left-hand turning knob (Pos. 30).

⇨



3 By pressing and at the same time turning the left-hand turning knob (Pos. 30), the set simulation speed (Pos. 40) can be changed.

Hinweis

The set simulation speed does not have to be set twice, the value is automatically the same for both possibilities!

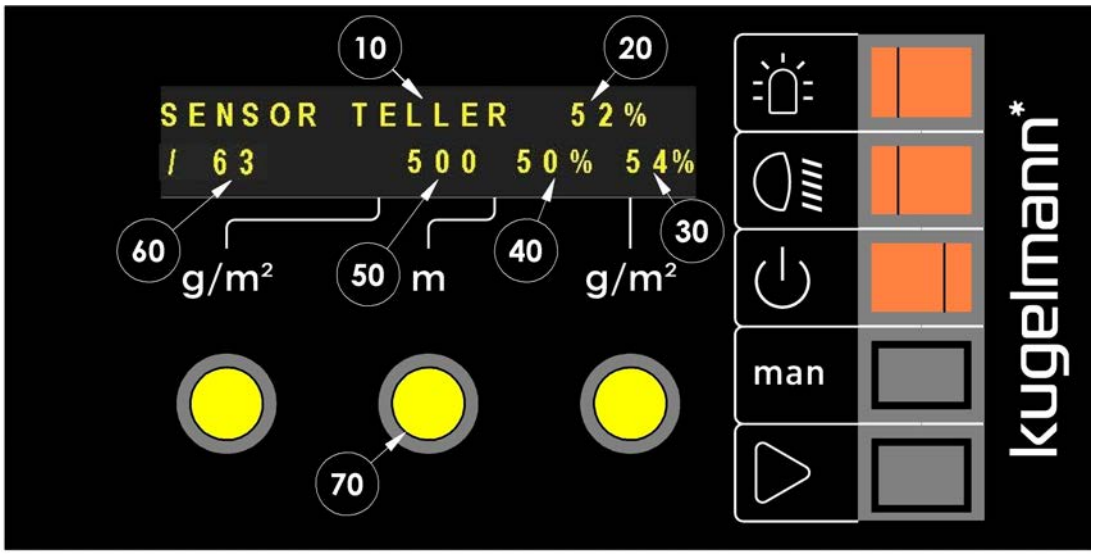
7.6 Checking and setting of sensors

Hinweis

Prerequisites:

- Spreader and carrier vehicle shall be in operation
- Make sure that hydraulic oil pressure is sufficient

This procedure is identical for all sensors (Example: disc sensor).



Pos. No.	Explanation
10	Specification of sensor
20	Averaged value for the distance of the sensor
30	Upper value for the distance of the sensor
40	Lower value for the distance of the sensor
50	Value for the current rating at the hydraulic valve
60	Current pulses per second (disc 20, ..., 70 pulses/s / screws 40, ..., 100 pulses/s)
70	Setting current rating at hydraulic valve

Caution

Sensor too close to the sensor disc.

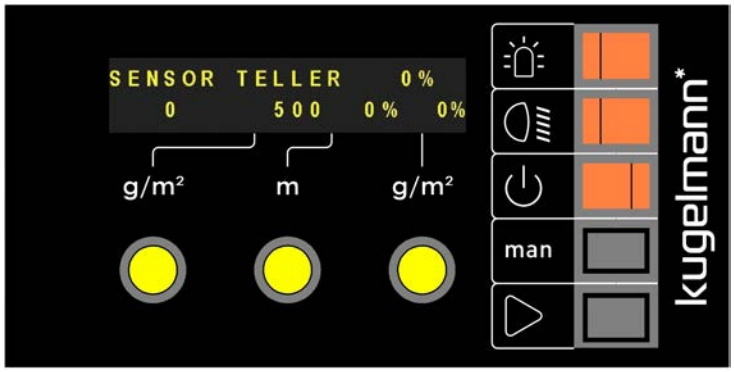
Danger of property damage.

- Start measurement with sufficient safety distance with regard to the sensor disc!

1 Call up menu (see Chapter *7.3 "Open menu", page 24*).

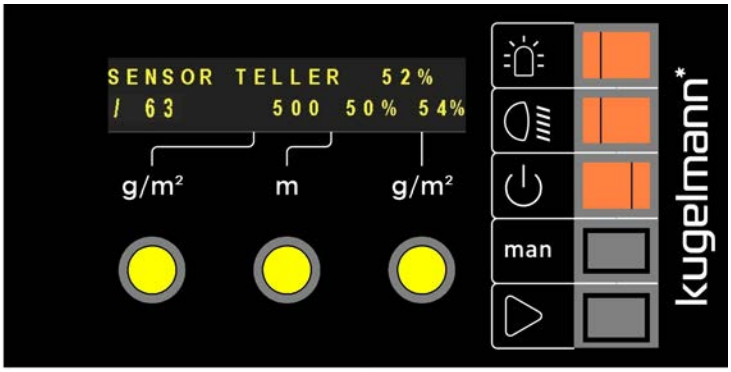
2 man Choose desired sensor (Example: disc sensor).

⇨



3 Start measuring by pressing and holding button down.

⇨

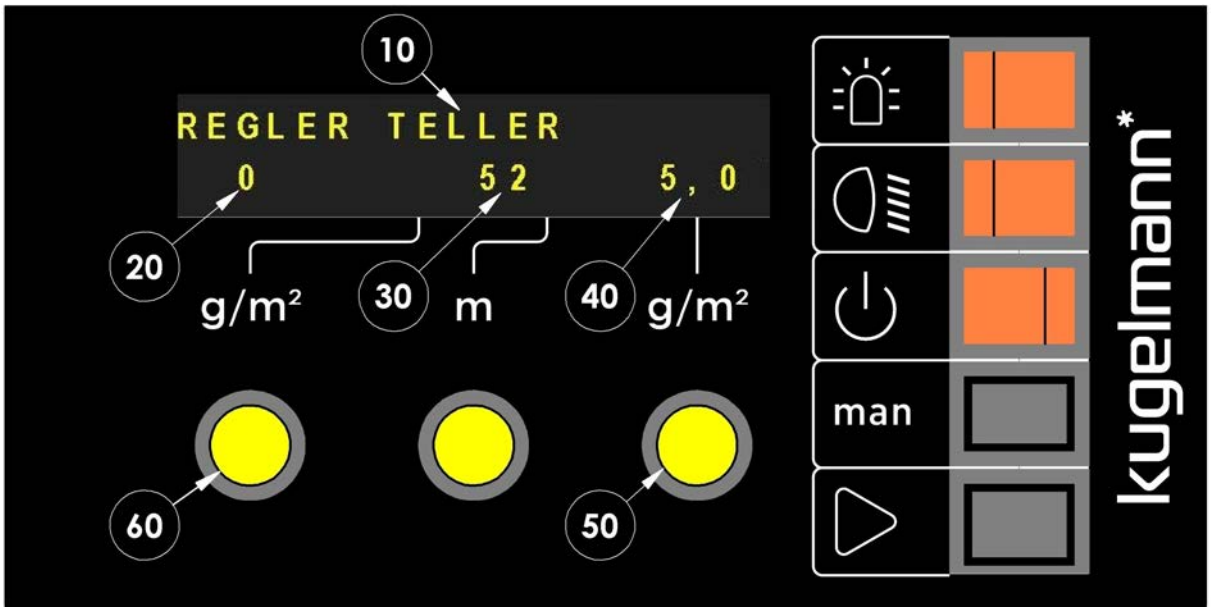


Pos. 20	
Value > 70%	Sensor too close ⇨ Turn sensor away from the sensor disc.
Value < 30%	Sensor too far away ⇨ Turn sensor in direction of disc.
30% < Value < 70%	Sensor appropriate (optimal 50%)

7.7 Regulator adjustment

All characteristic curves have to be configured before the control system can be put into operation:

- Characteristic curve disc
- Characteristic curve left-hand screw
- Characteristic curve right-hand screw



Pos. No.	Explanation
10	Specification of regulator
20	Points in cam (0, 1)
30	Regulator value (0, ….., 2000 mA)
40	Pulses per second (Hz)
50	Setting pulses per second (Hz)
60	Selection of points on the curve (0, 1: Press and turn)

Hinweis

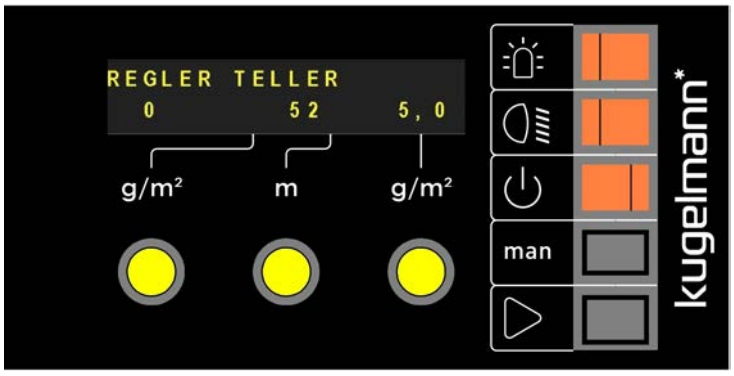
Hydraulic oil performance must be consistently high!

⇨ Motor speed approx. 2000 1/min

1 Call up menu (see Chapter *7.3 "Open menu", page 24*)

2 man Actuate several times.

⇨



3 Start adjustment.

4 Repeat procedure for left-hand screw and right-hand screw.

5 Checking results (rated range):

- Disc:
  - Regulator value 0 (Pos. 30) at 1 Hz (Pos. 40): 250 - 350 mA
  - Regulator value 1 (Pos. 30) at 70 Hz (Pos. 40): 650 - 850 mA
- Left-hand and right-hand screw:
  - Regulator value 0 (Pos. 30) at 1 Hz (Pos. 40): 200 - 350 mA
  - Regulator value 1 (Pos. 30) at 170 Hz (Pos. 40): 650 - 850 mA

7.8 Error delay

Time of error delay (undersupply/oversupply hydraulic drive) can be set in this menu point. During this time, the hydraulic cycle can regenerate and errors are only detected by the control system after the set time.

1 Call up menu (see Chapter *7.3 "Open menu", page 24*).

2 man Actuate several times.

⇨

3 Set desired error delay time at the right-hand turning knob (0.0 , ..., 60.0 s).

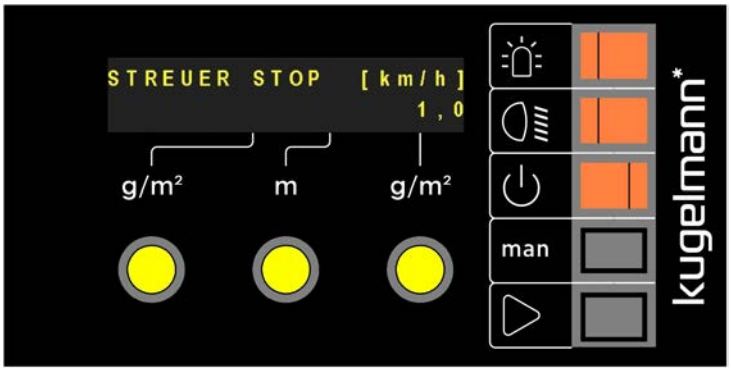
7.9 Speed when spreader stops

Definition of speed below which spreading will be stopped.

1 Call up menu (see Chapter *7.3 "Open menu", page 24*).

2 man Actuate several times.

⇨

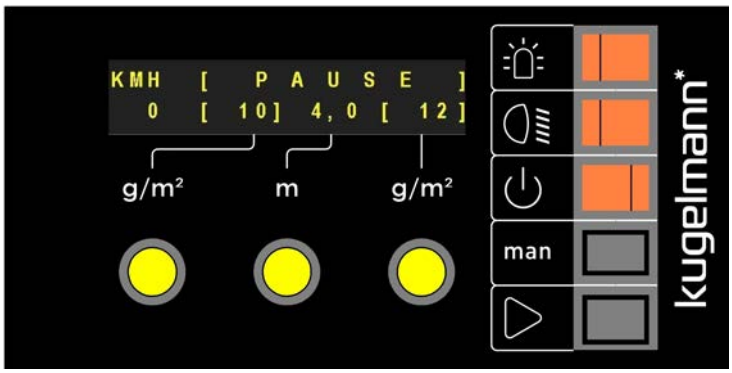


3 Set desired speed when spreader should stop at the right-hand turning knob (0.1, ..., 25.0 km/h).

7.10 Configuration of spreading width

1 

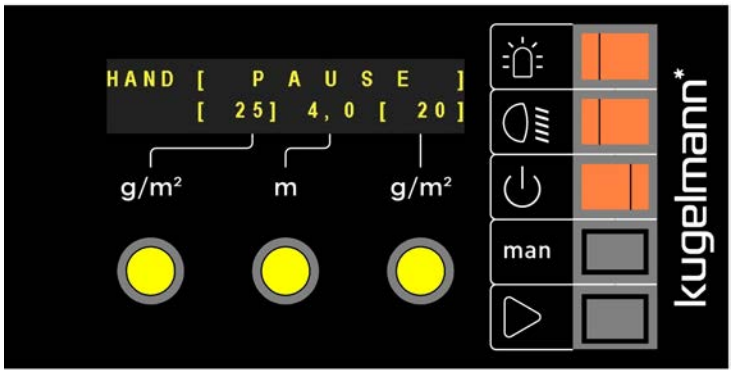
Switch on control system (see Chapter *7.2 "Switch on / off control system", page 23*).

⇨ 

Example for basic setting of spreading width (4.0 m).

2 man

Actuate.

⇨ 

3 

Start spreading.

4

Spread until a clear spreading image can be seen on the ground.

5 

Finish spreading.

6

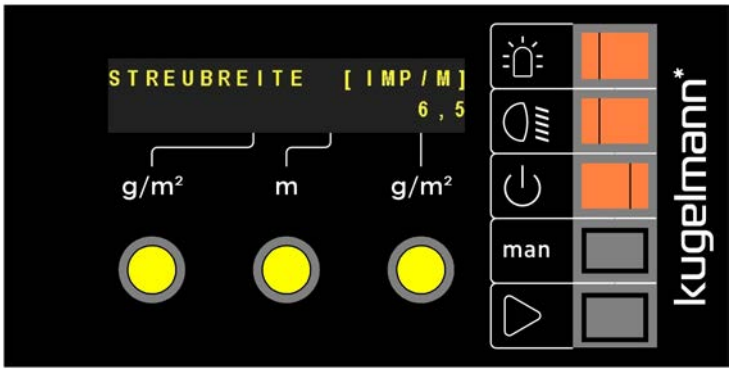
Measure spreading width.

If there is a difference compared to the set spreading width (in this example: 4.0 m), this difference shall be corrected as follows:

1  Switch off control system (see Chapter *7.2 "Switch on / off control system", page 23*)

2 Call up menu (see Chapter *7.3 "Open menu", page 24*).

3 man Actuate several times.

⇨ 

4 Turn at right-hand turning knob:

- > 6.5 pulses/m → wider spreading image
- < 6,5 pulses/m → narrower spreading image

7.11 Disc stop standstill / pause

If this function is active (YES), the spreading disc stands still when pressing Standstill / Pause. Only when pressing run-up / start, it will move again.

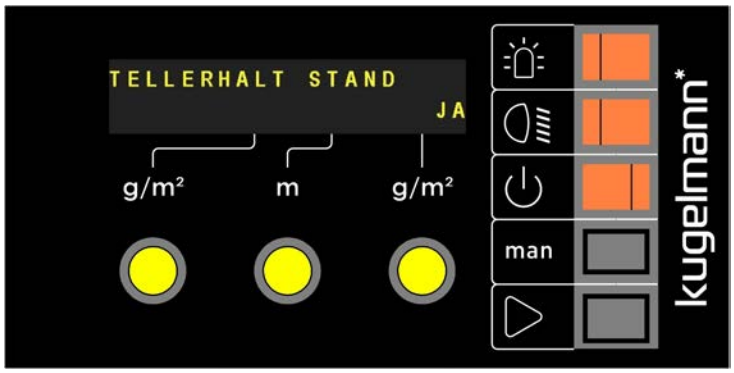
If this function is inactive (NO), the spreading disc continues to turn during standstill / pause.

The conveyor screws stand still in any case.

1 Call up menu (see Chapter *7.3 "Open menu", page 24*).

2 man Actuate several times.

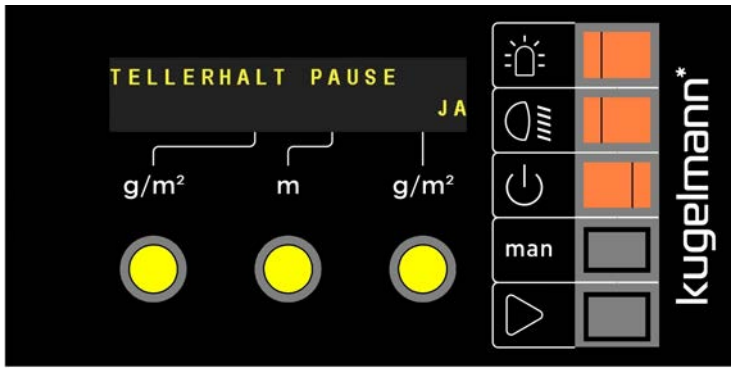
⇨



4 Choose “YES” or “NO” by turning the right-hand turning knob.

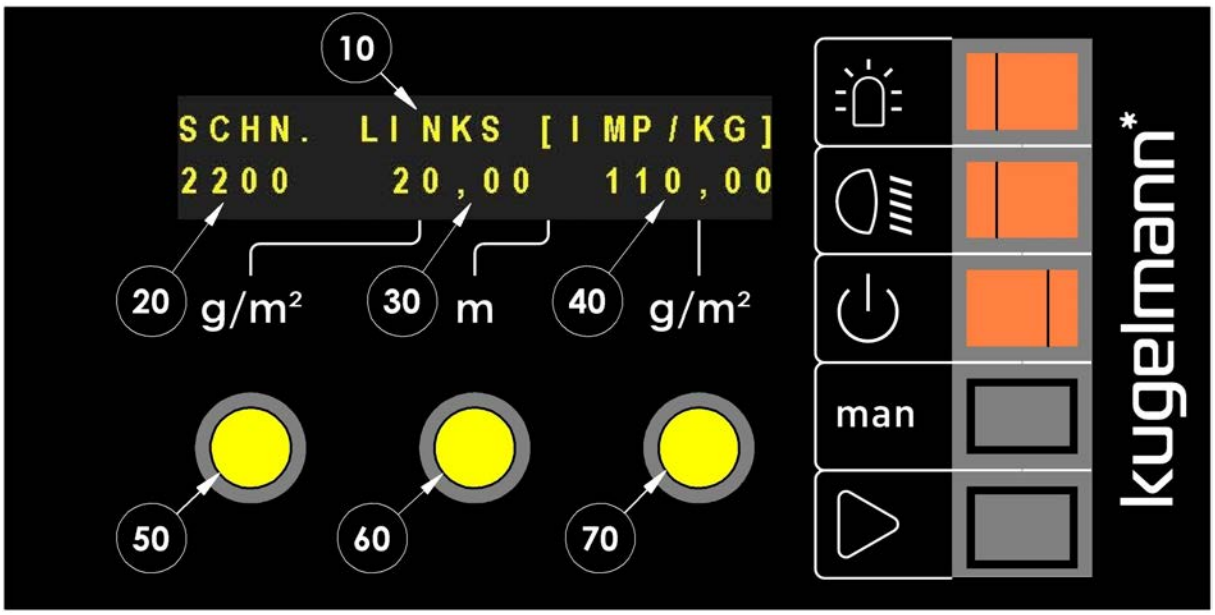
5 man Actuate.

⇨



6 Choose “YES” or “NO” by turning the right-hand turning knob.

7.12 Weighing of spreading materials



Pos. No.	Function
10	Specification of conveyor screw (left/right)
20	Pulses
30	Spread quantity [kg]
40	Pulses/kg
50	Press to confirm and calculate again
60	Setting of spread quantity (Pos. 40)
70	Setting of pulses/kg

1 Fill in spreading material into the spreader and put a reservoir that is appropriately large under the screw conveyor outlet.

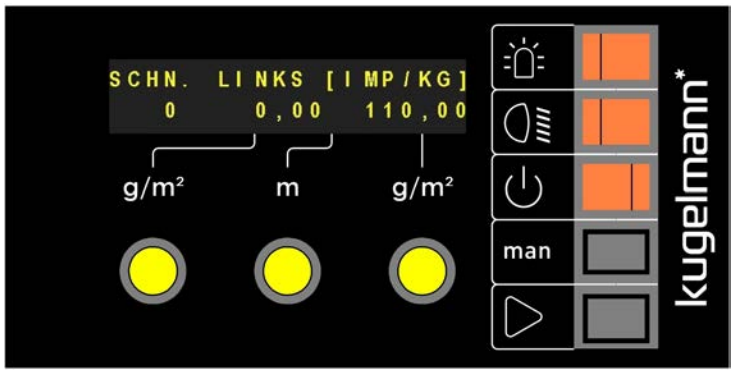
2 Start spreading operation (see Chapter *8.6 "Start spreading", page 49*) until the screw tunnel is filled.

3 Switch off control system (see Chapter *7.2 "Switch on / off control system", page 23*), empty reservoir and place it under the screw conveyor outlet again.

4 Call up menu (see Chapter *7.3 "Open menu", page 24*).

5 man Actuate several times.

⇨



6

7 ▷ Press and hold it pressed.

⇨

For a more detailed setting, we recommend to take out 20 kg.

8 Now, weigh the collected spreading material and compare it with the middle value (Pos. 30) (here: 20.00 kg).

9 By turning the middle turning knob (Pos. 60), enter the weighted result:

- Pressing + turning = 1.0 kg steps.
- Turning = 0.01 kg steps

10 After this setting, press left-hand turning knob (Pos. 50) to calculate pulses/ kg again and to repeat the whole procedure for control purposes.

11 Carry out this procedure in the same manner for the right-hand conveyor screw.

7.13 Density locked

With this setting, the output rates of the right-hand and left-hand chamber can be locked. If “YES” is chosen in the setting, both chambers will be emptied continuously in equal measure. Regardless of whether the right-hand or left-hand turning knob is turned, the spreading quantity to be spread remains the same for the right-hand and left-hand side.

When choosing “NO”, it is possible to set different output rates for the right-hand and left-hand chamber.

1 Call up menu (see Chapter *7.3 "Open menu", page 24*).

2 man Actuate several times.

⇨

3 Choose “YES” or “NO” by turning the right-hand turning knob.

7.14 Sensor chute available

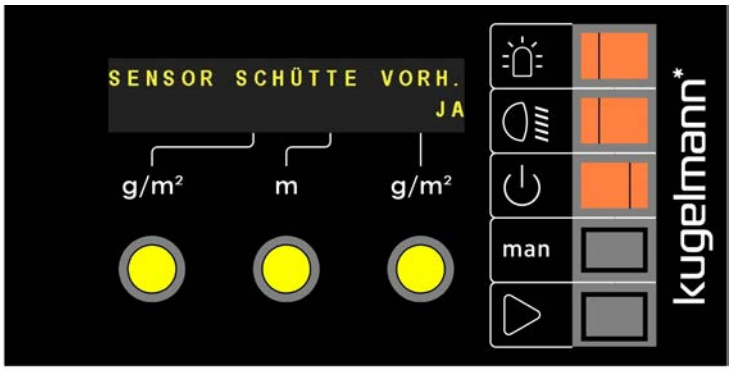
Setting specific for different types of spreaders:

– “YES” for truck-mounted spreaders
– “NO” for three-point spreaders

1 Call up menu (see Chapter *7.3 "Open menu", page 24*).

2 man Actuate several times.

⇨



3 Choose “YES” or “NO” by turning the right-hand turning knob.

8 Operating instructions

This chapter gives you information on the following:

8.1 Switch on/off rotating beacon

- Unlit push-button → rotating beacon off
- Push-button illuminated permanently → rotating beacon on
- Push-button permanently flashing → rotating beacon error

Push-button rotating beacon

8.2 Switch on/off working headlights

- Unlit push-button → working headlight off
- Push-button illuminated permanently → working headlight on
- Push-button permanently flashing → working headlight error

Push-button working headlights

8.3 Path-dependence and manual operation

Difference path-dependence and manual operation:

Path-dependent spreading:
The control system calculates the spreading quantity **[g/m²]** according to the vehicle speed and the spreading width.

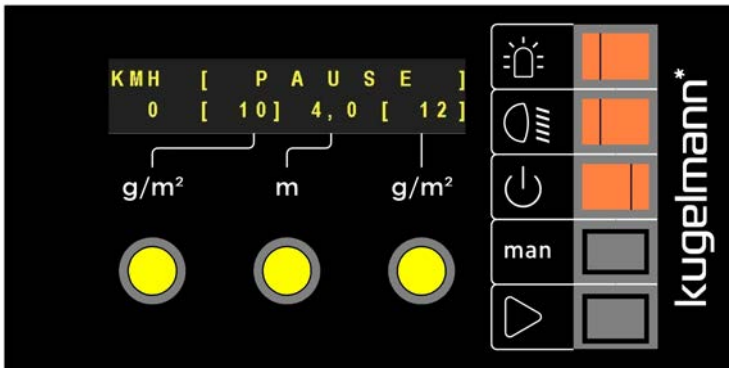
Example:
- Left-hand side 10 g/ m² ⇨
- Right-hand side 12 g/ m²

Manual operation:
The control system calculates the spreading quantity **[kg/min]** for the spreading procedure according to the set values independently of the actual vehicle speed.

Example:
- Left-hand side 25 kg/ min ⇨
- Right-hand side 20 kg/min

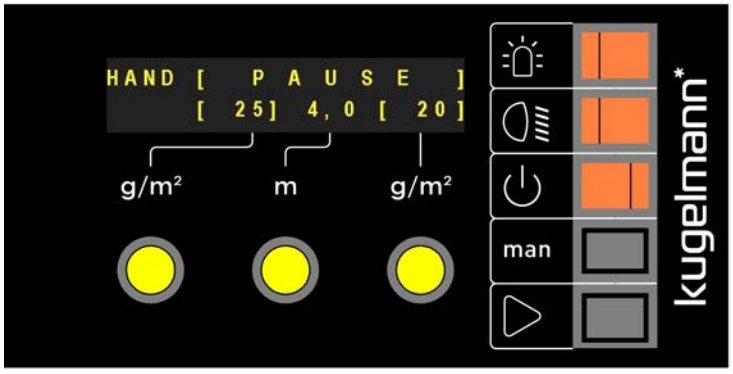
1 Switch on control system (see Chapter *7.2 "Switch on / off control system", page 23*).

Start screen (path-dependent ⇨ spreading)



2 man Actuate.

Manual operation ⇨

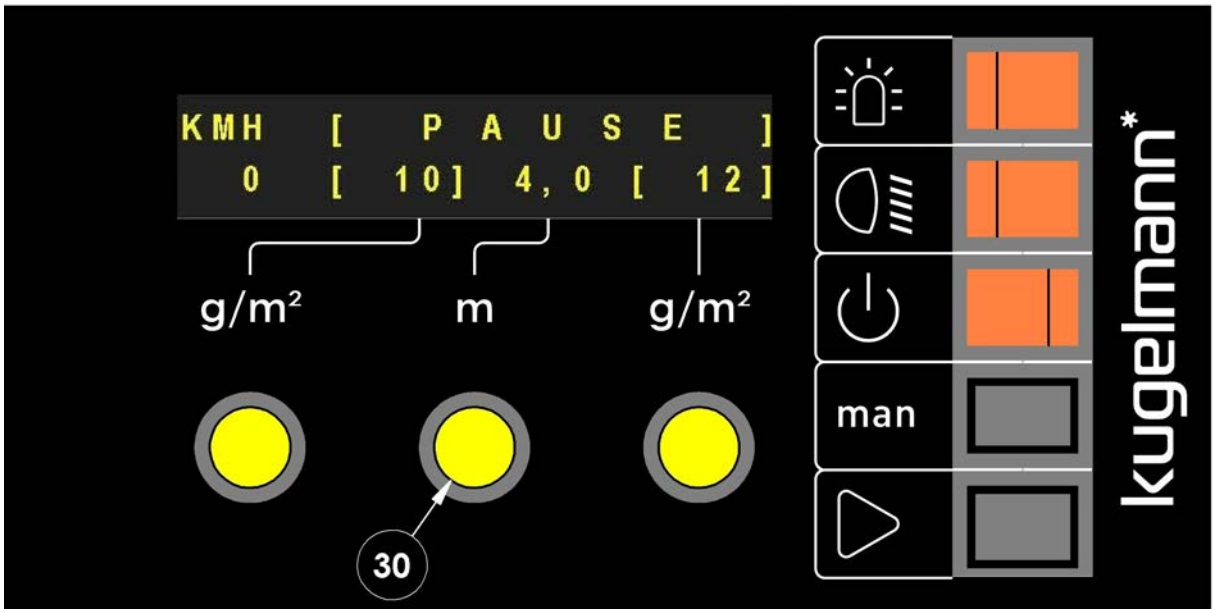


3 man Actuating once more changes from manual operation to path-dependent operation.

Hinweis

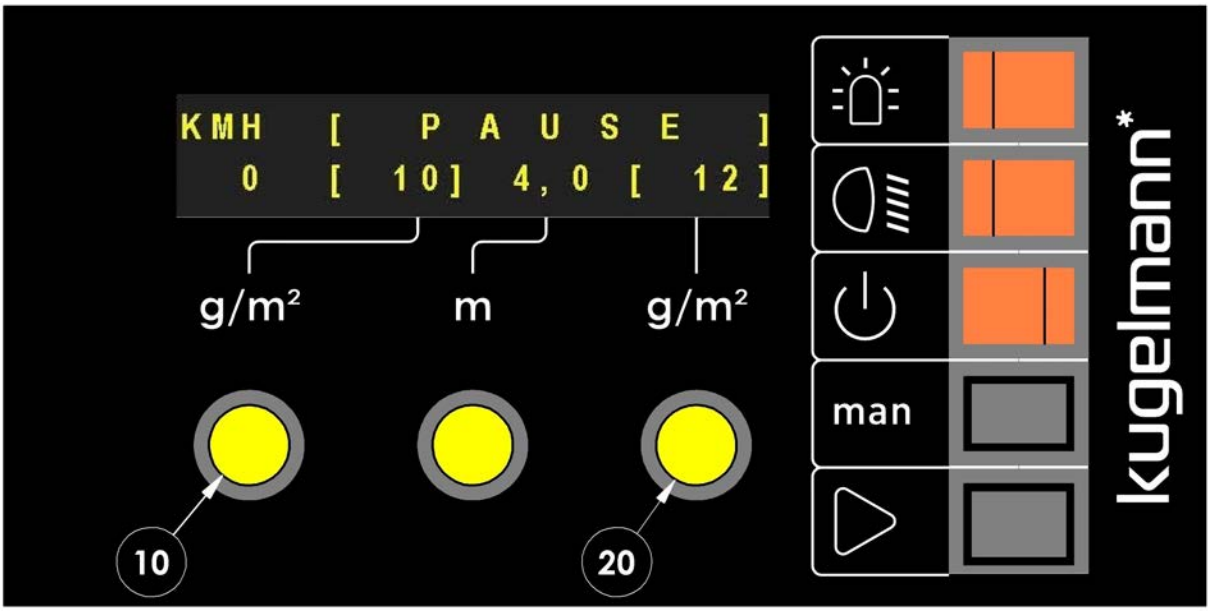
After each restart, the control system works always path-dependent!

8.4 Setting of spreading width



- Turn at the middle turning knob (Pos. 30) to increase/reduce the spreading width [m] (in this example 4.0 m).

8.5 Setting of spreading density



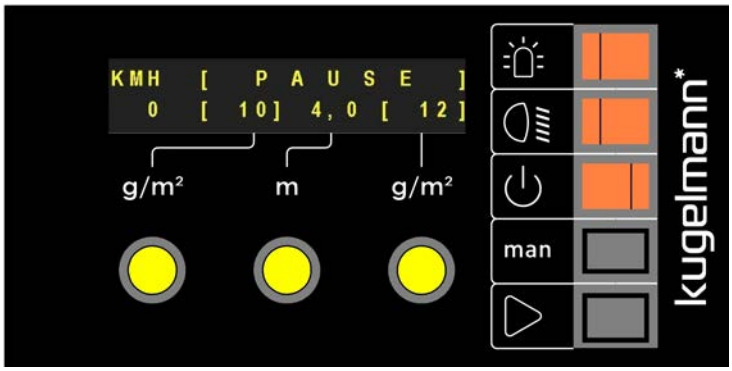
- Turn at the left-hand turning knob (Pos. 10) to increase/reduce the spreading quantity of the left-hand conveyor screw (in this example 10 g/m²).
- Turn at the right-hand turning knob (Pos. 20) to increase/reduce the spreading quantity of the right-hand conveyor screw (in this example 12 g/m²).
- Lock density (see Chapter *7.13 "Density locked", page 41*) in order to evenly increase/reduce the spreading quantity of both conveyor screws by turning the left-hand or right-hand turning knob (Pos. 10, 20).

8.6 Start spreading

Path-dependent spreading (see Chapter *8.3 "Path-dependence and manual operation", page 45*):

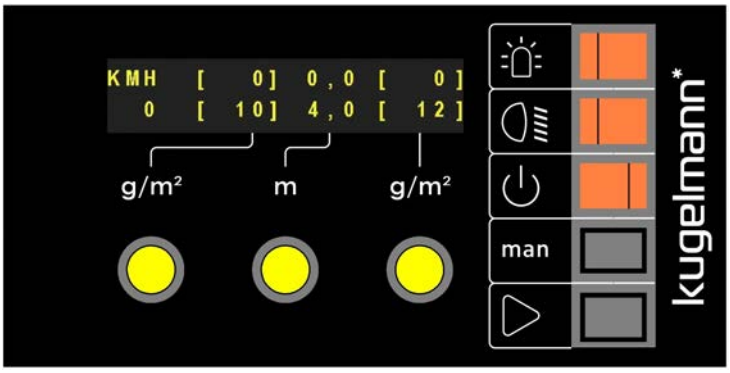
1 Switch on control system (see Chapter *7.2 "Switch on / off control system", page 23*).

⇨



2  Start spreading.

⇨

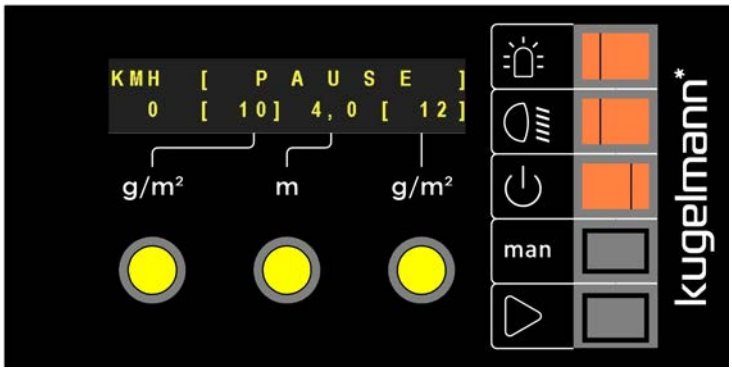


Spreading starts as soon as the carrier vehicle starts to move.

Manual operation (see Chapter *8.3 "Path-dependence and manual operation", page 45*):

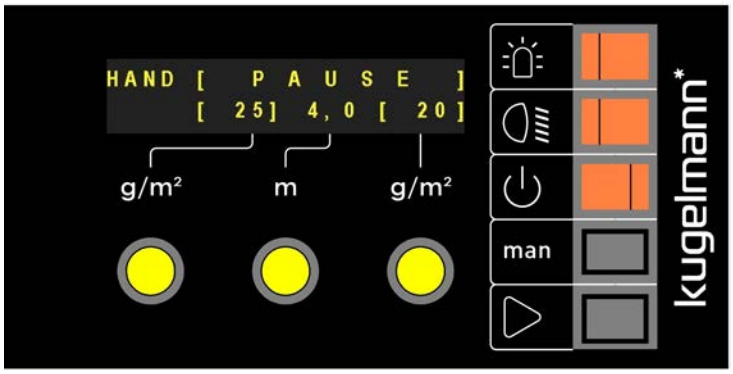
1 Switch on control system (see Chapter *7.2 "Switch on / off control system", page 23*).

⇨



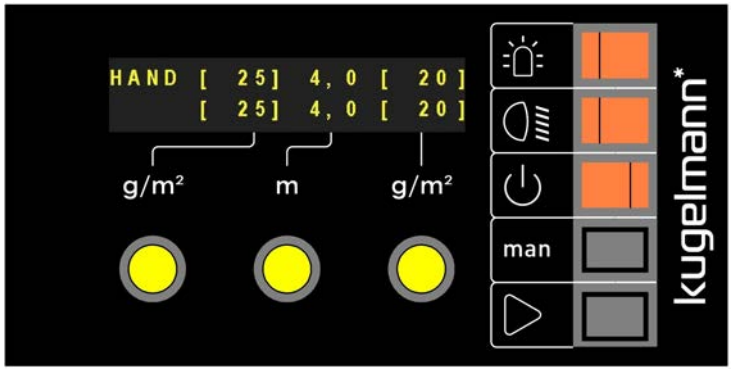
2 man Actuate.

⇨



3 ▷ Start spreading.

⇨



Spreading starts.

9 Storage

This chapter informs you on necessary precautions that have to be taken when putting the control system into stock.

Hinweis

- Always store the control system in a dry, covered, frost-free and salt-free area.
- Protect the control system against direct sunlight.
- Store the control system at a dust-protected place, if necessary, in an appropriate bag.

10 Technical Data

Supply voltage	10 - 30 V
Internal operating voltage	12 V
Power input	max. 10 A

11 Disconnecting the system

The control system must be disposed of in accordance with local or state regulations. Dispose of electrical and electronic waste at the collection points provided for this purpose. Kugelmann also takes care of the disposal.

Warranty

Kugelmann Maschinenbau e.K., 87675 Rettenbach a.A., warrants its machines to be free from defects in material and workmanship and undertakes to replace free of charge all parts ex works which have been purchased from relevant Kugelmann dealers and have been acknowledged as defective after having been checked by Kugelmann. The warranty expressly given shall be limited to a period of 12 months from the date of delivery of the machine to purchaser. All further claims by the customer shall be excluded.

All wear parts are excluded from warranty.

The manufacturer takes no responsibility for third-party products not produced at the works of Kugelmann. However, we assign our claims against the supplier to the customer. No warranty will be given for machines purchased second-hand or used and modified or converted machines.

Hinweis

Please make sure that you fill in your warranty card and send it back to the manufacturer immediately. Claims have to be notified with a warranty claim in writing after their occurrence without undue delay (after 30 days at the latest).

Company
Kugelmann Maschinenbau e.K.
Gewerbepark 1-5
87675 Rettenbach a.A.
Germany

Device type: .....
Serial number: .....
Number of control system: .....

Address of dealer:
.....
.....
.....

Address of user/owner:
.....
.....
.....

I have read the operating instructions.
Signature of user: .....
The warranty card has to be sent directly to the manufacturer.
ATTENTION: Warranty claims are only accepted with the warranty card of Kugelmann Maschinenbau e.K.

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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.