

DUPLEX | DUPLEX INOX

Mountable Spreader



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Important instructions

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CHAPTER 01



Important Instructions

Intended use of spreader

The spreader must only be used as intended. Grit, de-icing salt and brine are spread with the spreading disk on the road surface. For beyond this the producer does not take over any warranty or liability.

To intended use also belongs observation of the operation and repair and maintenance instructions stipulated by the producer.



Operation of the equipment its care, repair and maintenance must only be done by instructed expert personnel.



Unauthorized changes of equipment preclude liability of the producer for resulting damages.

The relevant accident prevention regulations are to be observed. This extends to the generally recognized safety-relevant, occupational medical and road law requirements. The safety requirements are laid down in DIN EN 292-1, DIN EN 292-2 and DIN EN 1553. In addition to the regulations being present the specific safety regulations of the country, in which the equipment is operated, have to be observed.

Inappropriate use



It is imperative that the permitted axle loads and also the permitted weights of the carrier vehicle are observed. In case you transport equipment in attachments or the structure it is imperative to take this into consideration.

Warranty and liability

The company Kugelmann Maschinenbau e.K., 87675 Rettenbach, guarantees that its machines/equipment are free of defects concerning materials and quality and commits itself to replace all parts without charge ex-works which were purchased from approved Kugelmann dealers and which are recognized as faulty by the company after an inspection.

The hereby expressly given guarantee is limited to the duration of 12 months beginning at the date of delivery to the customer and precludes any further claims.

The producing company does not offer any guarantee on third party products not produced by it. It does, however, assign its claims which it has against sub-contractors to the customer. No warranty is given for used, second hand purchased and changed or modified machines.

Claims have to be made immediately after the damage occurred, after thirty days at the latest and in writing. The faulty parts have to be sent in.

Furthermore, the company Kugelmann is not liable for injury to persons or damage to equipment which is caused by the following:

- operation of the mountable spreader while safety installations are defect or not installed appropriately or non-functioning safety and protection installations.
- non-observance of danger and warning notices in the operating instructions
- non-observance of important notices in the operating instructions such as start-up, operation and maintenance/care of the spreader
- insufficient monitoring of machine parts which are subject to wear
- inappropriately carried out repair work
- force majeure or catastrophies

EU-conformity declaration, mark of conformity, copyrights



EU-conformity declaration:

Hereby the company Firma Kugelmann e.K., Gewerbepark 1-3, D 87675 Rettenbach declares, that the mounting salt spreader Duplex, conforms to EU directives because of its design and the way it is produced.

The EU-Directive

91/368/EEC

98/37/EC for machines

As well as the 93/68/EEC for marking were observed.

Also

DIN EN 292-1

DIN EN 292-2

DIN EN 1553 are fulfilled.

All basic safety and health requirements are fulfilled with the equipment brought on the market.

Copy right of this technical documentation as well as all other copyrights and property rights rest with company Kugelmann e.K., 87675 Rettenbach.

For mistakes in the translation into other languages the company Kugelmann takes no responsibility. Claims can only be made to the documentation in the German language.

Josef Kugelmann

Signs and symbols, general safety and accident prevention regulations and hazard warnings

Besides the notices in this operating manual observe all generally valid safety and accident prevention regulations!

The attached warning and notice signs give important information for safe operation. Observing them serves your safety!

Every person who operates or drives this vehicle combination has to be familiar with the operation instruction of the carrying vehicle.

Explanation of symbols



Work safety symbol:
Danger! Direct danger for life and health!



WARNING
Warning notice! Possibly threatening danger for life and health!



Info
Important information for appropriate use of machine!



Tip
Suggestion for making work easier!

Obligations of operator



He has to take care that only instructed and trained personnel operate the spreader. The responsibility of the personnel is to be defined clearly concerning setting-up, operating, handling and repair and maintenance of the equipment.



All persons confronted with operating, repair and maintenance of the machine must have read and understood the safety and warning notices



The operating instructions have to be kept at the place of work at all times, in this case, e.g. in the driver's cab.

The operator has to observe the following:



He has to take care that the vehicle combination is in safe operating and roadworthy condition! Work which does not meet regulations has to be refused.



Before driving the driver has to check the fixation (tension belts, chains, bolts etc.) of the spreading equipment.



Unauthorized persons have to be sent away from the vehicle/equipment and its danger and working zone.



All safety and danger notices at the spreading vehicle have to be kept in legible condition.

Most accidents can be avoided by observing some simple safety measures.



**In case of danger for humans and equipment the equipment has to be closed down immediately and the customer service be contacted.
SWITCH ENGINE OFF AND REMOVE IGNITION KEY!!!**



**No work while machine is running!
SWITCH ENGINE OFF AND REMOVE IGNITION KEY!!!**



Never work near engine in loose clothes which can get entangled in running parts!



Make sure that when the machine is in operation all protections are installed!



After turning off of the equipment tools/machine parts may continue to run!



During work at the equipment use a ladder, if available. If not, create slip-resistant climb-up.



The required protective equipment has to be supplied by the owner and to be worn by personnel!



When loading the spreading equipment the permissible loads of the carrying vehicle have to be observed (axle weight, permitted total weight)! Especially with further additions and mountings it is imperative that the permissible axle weights are not exceeded.



Adjust your driving to the operation at full load! This is especially true under slippery road conditions and downward slopes!



Be aware that the centre of gravity rises with full load although the construction is kept low by design. There is, in general, an increased risk of tipping.

Safety rules for the handling of hydraulic conduits, couplings and parts.

Remember that high pressures are created in hydraulic conduits. Squirting out oil can lead to injuries and fires.



Remove pressure in pressure lines before coupling on and off.



Damaged hydraulic hosepipes are to be replaced immediately. In general. Hydraulic hosepipes have to be exchanged after 6 years.



Only personnel with special knowledge and experiences are allowed to work at hydraulic installations. Better go to a special workshop immediately.

CHAPTER 02



Labelling and hazard warnings

WINTERSERVICE



Warning sign: „Stay in danger zone prohibited. Before operating read and observe the operating instructions!"



Warning sign: During all work at the machine shut down engine and remove ignition key!"



Reflecting warning markings on back of spreader



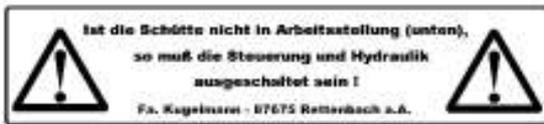
Spreading equipment label Duplex Inox, stainless steel version VA



CE – sign on the basis of EU-conformity declaration



Producing company Kugelmann



Danger notice. If this chute is not in operating position control and hydraulic may only be switched on for emptying procedure.

Kugelmann mountable spreader with labelling warning notices, working lights and all-round beacon.



Chapter 03



Technical data, equipment

Producer

The company Kugelmann Maschinenbau e.K., Gewerbepark 1-3, D-87675 Rettenbach a.A., Tel. 08860/ 9190-0, Fax. 08860/ 9190-19, is the producer of the mountable salt spreader „Duplex“.

Working areas and possible uses

The Kugelmann- mountable spreader equipment can spread grit, de-icing salt and brine solution in all variations. With the control (MCSS 3/4 and k-tronic, respectively) individual components as well as two or 3 components can be spread in an extremely precise way.

Freely adjustable depending on the design of the spreading disc, the spread pattern can be varied from flush with the kerbside to asymmetrical across the oncoming lane. What always applies is, you mix your spreading material in any ratio. The driving speed has to be adjusted to the spreading width and the spread quantity.

Machine data

The mountable spreader equipment „Duplex“ has a capacity of 0.4 to 5 m³ for solid spreading material. The spreading equipment has 2 equally sized chambers. There is another option of dividing the spreading material chambers into 1/3 to 2/3.

Another option is to supply the spreading equipment with brine equipment for spreading damp salt. The volume of the brine tanks is designed for FS30.

The hydraulics of the carrying vehicle serves as drive as long as the capacity of the pump is sufficient. For this pressureless return flow is required

In case the hydraulic pump of the carrying vehicle does not have the required output the company Kugelmann Maschinenbau e.K. offers an additional p.t.o. hydraulic pump. As a further variant, mounting of a motor aggregate is possible.

The spreader can be delivered in the version sheet steel / partly VA or completely VA (designation Inox). The operation of the spreader is done through controls MCSS 3/4 and k-tronic, respectively.

Prerequisite for the carrier vehicle

The hydraulic system must achieve 40l/min. and a pressure of 200 bar and a nominal pressurefree return flow of at least 18, better 22.

An electronic drive signal at the carrying vehicle makes a simple connection to the control possible. With a speedometer which is driven mechanically by a speedometer shaft a pulse generator has to be mounted on site with a square wave pulse which is proportional to the driving speed.

Hydraulic systems with performance-linked load sensing have to be able to deliver a conveyed volume of 40 l/min for an indefinite period.

An additional p.t.o. hydraulic pump can be delivered optionally, if the carrying vehicle does not reach the necessary conveyed volume.

If the carrying vehicle does not have a p.t.o. shaft, a driving unit independent of the carrying vehicle can be supplied through the company Kugelmann.

Standard version

An all-round beacon at the rear of the spreader , a working light at the spreading disc suspension, outer valance as well as a convertible roof of PVC tissue, which can be operated through a drawstring are part of the standard version of the Kugelmann Spreader „Duplex“.

Spreading disc versions

The spreading discs are exclusively made from stainless steel VA. The standard version for spreading de-icing salt and grit has shorter spreading blades than the spreading disc for damp salt.

Special equipment, additional equipment, options

Electric spread pattern adjustment (ESP)

The electric spread pattern adjustment (ESP) increases comfort. The operator can adjust the spread pattern from the driver's cab more to the right or to the left.

Damp salt equipment

The damp salt equipment as an additional equipment allows moistening of the spreading material with brine. This saves spreading material and is friendlier to the environment. The damp salt equipment is so optimally placed that the centre of gravity of the spreader is even lower.

Mountable kits

Various mountings are possible (mounting kits):

Mounting is on the platform, whereby the spreader is fixed with lashing straps.

Weight can be saved through mounting with an intermediate frame (spider). Thereby the tip truck platform and fixing with lashing straps are not required. The spider is held directly by the ball holders of the tip truck platform.

A support tripod offers the opportunity to to dismount the spreader within a short time. Depending on the spreader two size types are available

Spreaders of a nominal volume of 4 m³ and more are preferably delivered on a rolling frame.

Description, special properties

The mountable spreader of the company Kugelmann works with utmost precision and effectiveness. The multiple versions provide you with the optimal mountable spreader for every possible carrying vehicle. The two-chamber system, symmetrical and asymmetrical, additional brine tanks, the perfect continuously variable spread pattern adjustment leave no wishes of the customer unfulfilled. The version partly in VA or Duplex Inox, entirely stainless steel, both with high quality special coating, guarantee a long life.

With the MCSS 3/4 or k-tronic control, respectively, the control unit can be operated simply and precisely. Both controls work road speed related in a closed loop system of all drives.

Short set-up times, low design and thus free view to the rear provide comfortable conditions for the driver. With only a few movements, for example he can bring the spreading disc in working position.

At the type label the following data or characteristics can be seen:

- spreading chamber width in cm
- spreading chamber height in cm
- spreading container length in cm
- M stands for medium rear length
- outlet: long, medium or short
- version, here steel
- Change code
- spreader Duplex



CHAPTER 04



Mounting, dismounting of the spreader

Mounting of the spreader

With tripod

The company Kugelmann offers tripods with 3t and 5t total capacity as special accessory.

Notice: to the empty weight of the spreader comes the weight of the filling. The resulting total weight must not be exceeded under any circumstances.



Carrying load, danger for health and life!



The spreader is put high and is carried by a tripod. Perhaps tie up cables and hydraulic hoses. Reverse slowly under the spreader and watch out for the correct position. For safety use a second person for giving directions. With the 4 hand cranks lower the spreader together evenly until the load is staken up by the carrying vehicle. Is the spreader loaded on the platform, it must, of course, be positioned correctly.

The spreader is secured with lashing straps only at the 4 corners to avoid shifting. For the first mounting the type of securing is determined by the producer und must be observed by all means.

If the mountable spreader has an intermediate frame (spider), take care that the the 4 claws of the intermediate frame fits into the balls of the vehicle. Secure the structure aith the foreseen pin.



During mounting the telescopic cylinder of the tip truck platform has to be secured against unintended extension.

Afterwards remove the tripod parts. With 2 hydraulic connections, one flow line and one reverse flow (with load sensing a third control line is added), the whole drive is, in priciple, connected. The two pipes cannot be confused, the return flow is always the thicker pipe.



Always connect the pipe for the pressure free return flow first!

Preconditions for the hydraulic equipment are, as described in chapter 3, a performance of the hydraulic pump of 40 l/min, 200 bar pressure and a pressure free return flow.

If the performance of the hydraulic pump of the vehicle is insufficient and there is a p.t.o. shaft, drive is done through an additional p.t.o. hydraulic pump. When installing the pump push the broad locking ring forward. Make sure that the pump is snapped in. The additional pump is secured at the carrying vehicle with a torque support. Hydraulic hoses connect the pump tightly with the hydraulic container. The pressure control valve is to be set to a pressure of 180 bar. The power take off shaft rotational speed has to be set at 540 rev/min. When the spreader is dismantled the p.t.o. additional hydraulic pump is put on a device attached for this purpose. The oil level at the pump is to be checked at regular intervals.

A drive via a separate drive motor becomes necessary if the performance of the vehicle hydraulics is insufficient and no power take-off shaft is available. The motor is factory-made and firmly attached to the mountable spreader. The prescribed maintenance intervals are to be kept.

Control MCSS 3/4:

The control unit MCSS 3/4 is connected with the spreader via 3 cables with plug connection. Two cables including connectors are connected with the cables coming from the spreader. Pay attention to the correct connection of the respective cables. The third cable including the 4-pole plug is the power supply with drive signal. This is connected with the built-in socket.

Control k-tronic:

With the version **built-in control device connection** the control unit (Master) is simply connected with the 19-pole socket. The spreader is connected with the plug box at the exterior of the vehicle. If the electric **connections of the spreader are removable**, as for example with the flying wiring harness proceed as follows:

➔ Attach connection box (terminal box with connection socket and connection cable) in the driver's cabin.

➔ Connect Master, control cable and power supply with the connection box. ➔ Plug in power supply and drive signal at built-in connection box in driver's cabin

With hangers

The mountable spreader can also be moved with hangers. The following has to be kept in mind.



Carrying load, danger for health and life! Do not stand under suspended loads!

Pay attention to the carrying capacity of the hanger, possibly consider partial loading.

Most suitable for this purpose are heavy-duty straps, which, of course, must have the required carrying capacity. Always lift spreader with a shackle.

Chain hangers with corresponding chain protection to avoid damage to the hull can also be used. Only secure at the intended eyes at the top and bottom, see picture.

Pay attention to sufficient length of the heavy-duty straps or chains, respectively, and take into consideration that considerably greater forces are created through angled pulling or deflection above the container. The diagram at slip shows you the maximum load. Make sure that the carrying capacity of the heavy-duty lashes or chain hangers are sufficient. Create safety reserves.

The point of gravity of the spreader is, viewed in driving direction behind the middle of the hull. In this position the spreader can be lifted in the horizontal.

Fixing on the loading platform with lashing straps. When mounting with intermediate frame (spider) fixing is done with eyes. The 4 claws of the intermediate frame have to fit into the balls of the vehicle frame.



The telescopic cylinder on the platform has to be secured against extension when mounting is done with a spider.

Hydraulic hoses, control cables are to be connected as described in the text „mounting with tripod“, assure power supply for control. Mounting is complete.

For mounting of a spreader which is driven via p.t.o. hydraulic pump or a separate drive motor see section „mounting of a spreader with tripod“ chapter 04, page 28.

Disassembly of the spreader equipment

Pull off the control cables and the hydraulic hoses. Push the 4 tripod parts completely back into the square tubes, and secure with eyes. Precondition is, of course, an acceptable level surface. Loosen lashing straps. When mounted with intermediate frames, pull out the 4 eyes, Lift mountable spreader with hand cranks (2 persons) high enough that the carrying vehicle can move out carefully. When dismantling pay attention to the real weight of the spreader. Remaining spreading material may increase the total weight considerably. The tripod or the hangers must be designed for these loads. Build in sufficient safety reserves. When disassembling with hangers pay attention to the point of gravity of the spreader to assure an even horizontal lift down.



Carrying load, danger for health and life!

Ready-to-use assembly

Proceed as described in chapter 4, page 28.

For connection of the electrical system see also file: assembly of electrical system.

Roll-Fix

Mounting of the spreader



The tip truck dumping body is to be cleaned before mounting the spreader. The tip truck dumping body and the spreader could be damaged through remaining material.



Pay attention that hydraulic pipes and connecting cables of the spreader are not hanging down and could thus be torn off during mounting of the Roll-Fix.

Lift tip truck dumping body slightly (about 15° to 20°).



If the angle of the tip truck dumping body is too high the spreader could move backwards during mounting.



If the angle is too small, the folding columns cannot be folded, because the columns are still resting on the ground or the lever for folding is too unfavourable. There is the danger that the spreader is pushed backwards.



Drive slowly, centred and straight under the spreader until the laterally attached indicators fold in. The back edge of the tip truck dumping body must not touch the folding columns.



When putting down the spreader always take a second person as a guide.

If the front rolls of the rolling frame lie on the tip truck dumping body, remove the safety bolts of the folding columns.



The safety bolts can be removed from outside. Never stand under the spreader when the safety bolts are pulled out.



Now drive backwards until the folding columns fold upwards.

If the columns are folded lower, the tip truck dumping body to about 5° to 7°.

Drive back further until the back edge of the tip truck dumping body is at the stop plates of the rolling frame.

Let the tip truck dumping body down completely. Weight is thus taken off the back supports.

Lift both support arms up with a hooked up cable winch.



Secure the lifted supports with both positioning bolts. Secure the positioning bolts with the respective splints.



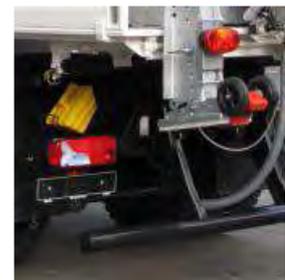
To pull the positioning bolts lift the supports slightly with the cable winch.

The vehicle lighting must not be covered.

Tie down the spreader on the tip truck dumping body with the supplied lifting tackle.

Insert the hydraulic pipes.

Insert the electric cables into the socket boxes.



Never remove the loading flaps on the side or drive with or lowered loading flaps while the spreader is mounted.

Putting down of a spreader with Roll-Fix

Chose a level and stable parking space with sufficient room to drive forward from under the spreader.

Unplug the electric cables of the control at the socket box. Unscrew protective flaps of the connector plugs. Only unscrew at the cap nut not at the connector housing.

Decouple the hydraulic pipes.

Unplug the cable of the Roll-Fix-additional lighting.

Place the cables such that they cannot be jammed and torn off when the spreader is re-mounted.

Remove all fixing elements between the spreader and the carrying vehicle.

Lower both supporting legs with a hooked up cable winch to the ground.

Secure each supporting leg with two bolts each. Use the lowest possible pair of holes for the bolts. On both sides use the pair of holes at the same height. Secure the bolts with the supplied safety elements against sliding out..



Lift the tip truck dumping body slightly, while the supporting legs are standing firmly on the ground. Drive slowly out until the folding columns are folded down completely. The indicators on the side then become visible.

Secure folding columns with safety bolts. Secure safety bolts with safety elements against falling out.

Drive carrying vehicle out completely.



Mounting with spider



Remove the platform of the carrying vehicle (see operating instructions of the producer)

In case of a tip truck platform, retract the telescopic cylinder and secure it against unintended use. Close the stop valve. Disassemble the stop valve or fix the stop valve in closed condition for example with cable straps.



Clean the support points of the intermediate frame of the platform. Through contamination at these points fixing of the spreader can be prevented, or the intermediate platform frame or the spreader can be damaged.

Drive under the spreader such that the tilt trays of the spider are directly above the ball points of the intermediate frame of the platform.



The person who serves as guide must never be between the spreader and the carrying vehicle.



So that the hydraulic pipes and hoses are not torn off, bind them upward before you drive under the spreader.

Remove safety elements from the tilt trays.

Put the spreader slowly down on the carrying vehicle. Lower the spreader with all tripods evenly.

Secure the put down spreader at the back tilt trays with the appropriate bolts and at the front tilt trays with the appropriate screws and security nuts.

Dismounting of the spreader with spider substructure

Empty the spreading material container.

The parking space must have sufficient carrying capacity and a solid surface.

Secure vehicle against rolling away.

Disconnect electric control cables between the spreader and the carrying vehicle or disconnect (detach) control. Screw protective covers on the connectors.

Turn off hydraulic supply for the spreader and detach hydraulic lines.

Insert lowering tripods into the appropriate guideway and secure with security bolts.



Never move vehicle with mounted spreader when lowering tripods are attached. While driving through curves or on uneven ground the feet of the tripods can touch and be damaged.

Remove positioning bolts at the back tilt trays. Remove screws at the front tilt trays.

Lift spreader via hand cranks of the lowering tripods evenly from the carrying vehicle.

Put back security elements – positioning bolts, screws and security nuts – into the tilt trays for safe keeping.



Often the back ball points are higher than the front ball points when the vehicle is not loaded. When driving the carrying vehicle out, this can lead to problems. Make sure that all tripod feet are extended to the same length and that there is enough space between the ball points and the tilt trays.

Drive straight from under the lifted spreader.

Putting down partially loaded spreader



The weight of the spreader and the load must not exceed the permissible load of the lowering tripods.



In case the tripods do not fit into the mountings of the spreader because of the compressed carrying vehicle, the base setting of the lowering tripods must not be changed (Do not put bolts into neighbouring holes). It would then be possible that the dipping height of the lowering tripods is insufficient to lift the tilt trays of the ball holders. In this case reduce the load so that the carrying vehicle is pressed further up by the springs.

CHAPTER 05



Operating the spreader

Control

Two models are available, the MCSS 3/4 and the k-tronic. A separate instruction for the control enables you to get more familiar with the subject. Here we only describe the operating elements.

MCSS 3 / 4

With the red toggle switch you turn on the all-round beacon, the lights as well as the spreader. In selection mode you set the values for automatic and manual spreading and you get into the setting menu. For details see the control operating manual.

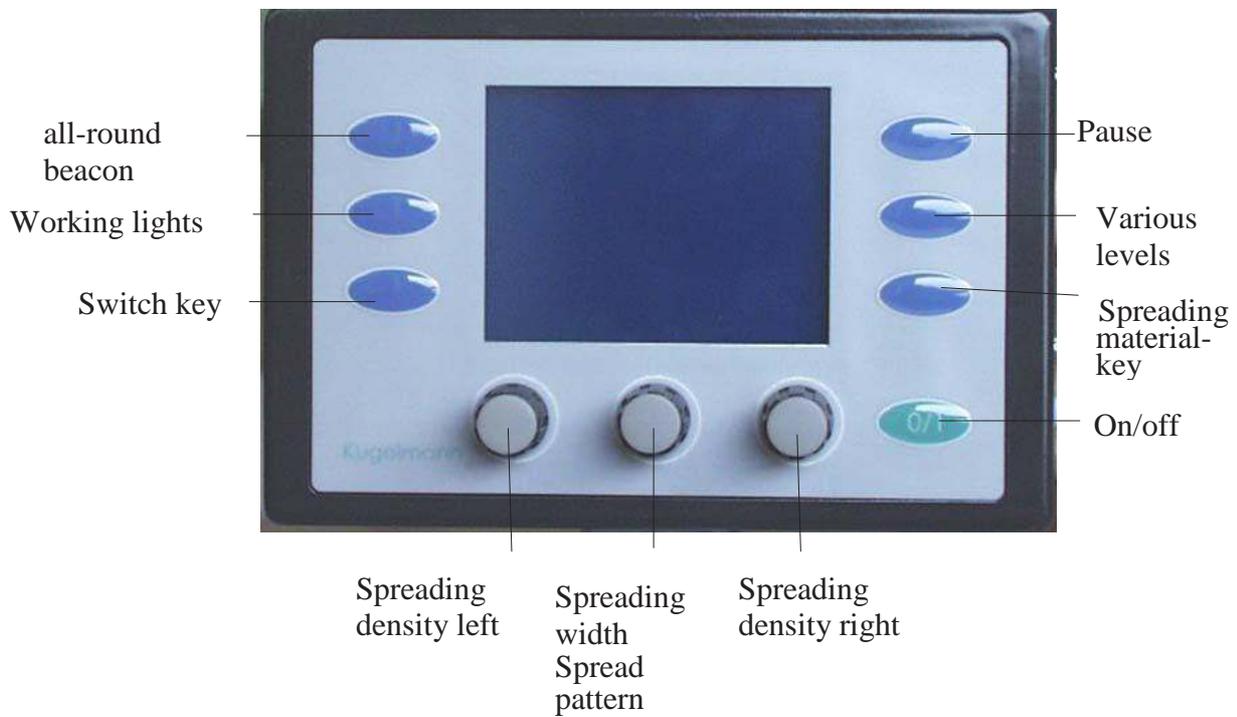
Display



- Dial knob left (spreading density left)
- Dial knob centre (spreading width)
- Dial knob right (spreading density right)

- Switch all-round beacon
- Switch working lights
- Switch control on/off
- Selection key
- Spreading/pause

See manual MCSS

k-tronic

See manual control k-tronic, operating manual.

Operation of the spreader

Filling of the spreader

Both spreading material chambers are equipped with a convertible roof which can be opened and closed with drawstrings.



Danger of squeezing. Only open roof with drawstrings. The hands must not be between the spreader and the locking mechanism!

The solid spreading material is filled into the chambers with a suitable loader, a device or from a silo. Pay attention to the axle weight and the permissible total weight. Weigh the vehicle when fully loaded and with all attachments. Determine the weight with lifted and lowered front device. In case the spreader vehicle is overloaded, you have to make a filling mark. Since grit has a higher density than de-icing salt, weighing with the latter is sufficient.

The grid of the spreading container is not to be removed during operation condition. Only when the spreader has been shut off completely may the grid be detached for fixing a short term malfunction.



If filled with refined salt dismantle the the screw-conveyor. Otherwise there can be malfunction of the spreading material supply.

Starting the spreader

Before driving check all fixations again. Is the spreader mounted in the correct position? Are all bolts fixed and properly secured?



Operation of the equipment, its care, repair and maintenance must always be done by instructed personnel.



Never work near the machine wearing loose clothes which can be caught in running parts.



**Do not work on the machine while it is running!
STOP MOTOR AND REMOVE IGNITION KEY!!!**



After shutting down the equipment tool/part of machine can still run on.

The spreading disc unit can be changed from transport mode to working mode with a few moves.

Draw fixing bolt of the locking device lever on the left side, turn by 90 degrees and snap into place.

Fold locking device lever upwards or to the front while holding on to the spreader unit. Swing spreader unit downwards. Draw locking bolt (left and right one each), move securing lever downwards with handle knob until the locking bolt snaps into the lower oblong hole. Make sure that both security levers are secured with the securing bolts.



Locking lever folded forwards, locking bolt with, snapping device inside, not visible here

Upper oblong hole

Locking bolt outside

Locking lever with handle knob

The spreading disc is set in horizontal position with two spindles by the factory.

Hand wheel for mechanical adjustment of spread pattern

Hand wheel to secure setting



Now you set the spread quantity through the control and control it according to k-tronic instructions.



If the spreading material is changed we recommend to definitely check the settings.

Setting of the spreading equipment

Refined salt and rock salt with standard density are set in the control and must be dry. All safety measure have been taken. De-icing salt has been filled into the chambers, the control system is ready for operation. The hydraulic drive or the respective other drive as well as the all-round beacon have been switched on.



The spread pattern often depends on the quality of the spreading material.



Is the height of the spreading disc is changed, so is the spreading width and the spread pattern. Bigger wheels of a higher platform, for example, can cause this.

Adjustment of spreaded quantity

The spreading unit is folded up, the sensor in the chute assures that the spreading disc is turned off.

Pay attention to the warning notice. Do not grab into the metering screw, there is danger of severe injuries.

Put an empty bucket of at least 30 litre capacity under the outlet of the metering screw. Furthermore, a scale for determining the precise weight of the spreaded de-icing salt is necessary.

Remove the brine hose from the spreading disc and hold it into a separate collecting container (bucket). Proceed as with the metering screw.

The spreaded quantity has to be set at each outlet and for each spreaded material.

The screw-conveyors have to be completely filled with spreading material. Therefore, move the screw-conveyor by hand over the flow divider block until the spreading material is delivered evenly. Empty buckets and place in position.



The k-tronic is described in the detailed description for the dealer.

Flowchart overview

- On the k-tronic → Detail menu → Spreading materials → Salt, grit or brine
- Impulse/kg Teachinleft or right (each screw conveyor separately)
- Press left dial knob until at least 1800 Impulses are reached
- Set the measured net weight at the dial knob in the middle
- Save „OK" value with righ dial knob

Spreadpattern adjustment

Let vehicle run in neutral while parked in an appropriate place, the spreading material container is ideally half full. Switch on hydraulic system at the vehicle if it does not have a hydraulic conveyor system which adjusts volume to performance (Load Sensing).

Manual operation on: → keep key down on the left side pressed → Press key on the right at the top → Let both keys go again → Press key on the top right again (spreading mode) →
Screw and spreader disc are turning



Never work near machine wearing loose clothes which can get caught in running parts.



**Do not work at running machine!
STOP MOTOR AND REMOVE IGNITION KEY!!!**



After stop of equipment tools/machine parts may still run!

After a few seconds stop the hydraulic drive and the vehicle.

Pay attention to the above mentioned danger notices. The spread pattern can be judged by the distribution of the spread material on the ground.

Exact spread material distribution is to be done according to TLG B3.

Adjustment of spread pattern

The company Kugelmann offers a mechanical and an electric (ESP) adjustment.

With the mechanical spread pattern adjustment the spreading disc is moved forward and backward with a hand wheel. The more spreading material is moved to the centre, the more the spread pattern is moved to the left.

The electric spread pattern adjustment functions via k-tronic.

Turn k-tronic on → press dial knob in the middle and turn left or right. The arrow on the display moves left or right accordingly → Press key on the top right start



If the arrow on the display is left of the middle the spread pattern is moved to the left accordingly. Analogously the spread pattern is moved right if the arrow on the display is visible right of the middle.

Brine equipment

Filling

Close stop valve next to the large debris filter.



The vehicle must not be moved while the filling hose is attached. Park vehicle at the place of filling and remove ignition key.

Connect limit switch cable of the filling equipment.

Connect filling hose via C-connection with the spreader.

Open stop valve of the filling equipment.

Start filling.



Limit switching

The limit switch is mounted at the factory in the highest position. This way the solid and brine chambers are emptied evenly when spreading with the FS30.

If only sections of the road are spread with damp salt, the brine tanks can only be filled partially.

In this case the limit switch can be attached at a lower position at the tank.

The arrow at the hexagon must show upwards.

The upper borehole is to be closed with a sealing plug.

Close stop valve at filler tube.

Remove filling hose and screw the sealing cover on the filler tube.

Unplug the limit switching cable and screw sealing cover on the installation box.

Open the stop valve next to the large debris filter for the operation of the spreader again.



If the limit switching is not used for filling, the brine tanks can overflow. In this case the unnecessary brine is drained off via an overflow hose at the back of the vehicle.

Setting of the brine nozzle

When the spreading conditions are extreme, the position of the sole infeed to the solid spreading material can be changed, when, for example the spread pattern has to be moved to the extreme right.

Brine with linear adjustment

Loosen screws.

Adjust brine nozzle.

Tighten screws again.



Brine with coaxial adjustment



Loosen screws.

Scale for checking the setting.

Adjust whole disc protection unit.

Tighten screws again.



Brine sensor

The sole sensor serves to control the flow of brine to the spreading disc. When control is on, the green operation control pilot lamp (LED) is on. If there is sufficient brine for safe operation of the spreader the yellow LED is on too.



The signals of the brine sensor are evaluated by the control and, in case of a fault, are displayed at the control panel.



For a failure-free operation there must not be any air bubbles in the inflow to the brine pump. Check large debris filter. Open stop valve.

Non-return valve

The non-return valve prevents the inflow of brine at the end of the operation with damp salt. It also makes sure that when the damp salt operation is switched on again brine is put out immediately.



With co-axial adjustment the non-return valve is at the disc unit. Do not tighten cover with a spanner – close only by hand.

With linear brine adjustment the non-return valve is located in the upper area of the chute. When the chute is folded up, the valve is in easy reach.



When folding up the chute the safety catches of of the chute must be put in.

If the connection hose between the brine pump and the non-return valve empties itself, it has to be checked whether perhaps salt crystals have formed in the valve. Salt crystals at the valve can have a negative influence on the tightness of the non-return valve.



To prevent crystals from forming, the non-return valve should be flushed during the summer break.

Large debris filter

The large debris filter prevents large particals from entering the brine pump.



Never operate the spreaders without large debris filters. If the large debris filter is missing the brine pump can be damaged.



To prevent the formation of crystals, the non-return valve should be flushed during the summer break.

Emptying the brine tanks

Emptying of the brine tanks can be done through the hydraulic system or the brin pump.

Another possibility to empty them is through the filling connection.

Manual operation via flow divider block

In an emergency the control can be done manually through the flow divider block. The setting of the three hand wheels (four for the damp feature option) is always the zero position. If this is not observed this leads to failures in the operation of the electric control.

The rotation speed of the screw of the right spread chamber can be set through the right hand wheel. The hand wheel to the left of it serves to set the rotational speed of the disc. To the left of this is the hand wheel for setting the rotational speed of the right screw. For the option of damp salt equipment there is a fourth hand wheel on the far left for the emergency operation of the brine pump.



Hand wheel
brine pump

Hand wheel
left screw
conveyor

Reverse key for
screw conveyors

Hand wheel
for spreading
disc emergency
operation

Hand wheel
for right screw
conveyors

To eliminate disturbances at the k-tronic control proceed as follows:
Turn hydraulic supply on. Turn k-tronic control on. Push screw conveyor reverse key (red or yellow) at Slave. The direction of rotation is regulated by the control.

This operation is to be executed with utmost care. Check whether the chute is free from blockages.

With the MCSS3/4 proceed as follows. Switch hydraulic supply on. At the MCSS3/4 control switch on the working lights. Set the hand wheel of the blocked screw conveyor to a value of about 5 to 6. Turn the toggle switch of the reverse to the corresponding side.

If the screws cannot be moved this way, the spreading material may be frozen or the screw is blocked through a foreign object. In this case the container has to be emptied with a shovel from above.



Under no circumstances remove the grid while the vehicle is in operation. Stop the motor and de-couple the hydraulic pipes.



Operation by hand is only foreseen in emergencies. Repair the defective part immediately, contact your dealer or an expert repair shop.



**If there is danger for humans or equipment the equipment has to be stopped immediately and the customer service be contacted.
STOP MOTOR AND REMOVE IGNITION KEY!!!**



The operator has to take care that the vehicle combination is found in an operating and roadworthy condition! Works which do not conform to regulations has to be refused!



Never work near the machine wearing loose clothing which can be caught in running parts!



Make sure that during operati9n of the machine all protective measures are attached!

Emptying the spreading material chambers after work

You should not under any circumstances leave the spreading equipment partly or fully loaded for an extended period of time. The spreading material should not freeze over night. Park the vehicle in a shelter protected from the weather and covered by a roof. After work fold the spraying unit upward, move the safety catches up until they snap into the upper elongated hole.

Remove possible deposits from the chute.

Secure the unit with the locking lever and the locating pins folded upwards. With the control the spreading material chambers can now be emptied. Chose an appropriate parking place, of course.

By contrast the brine tanks can remain filled.



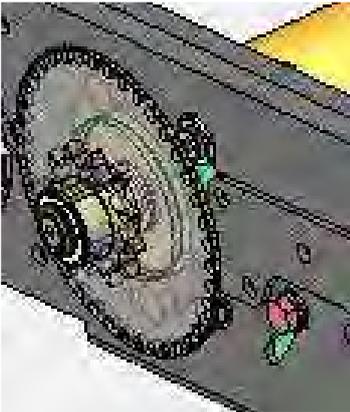
Chapter 06



Maintenance and care, wear parts

Maintenance and care

The mountable spreader of the company Kugelmann is for the most part maintenance free. The bearings of the screw conveyors are at the front equipped with lubricating nipples. The chain tension (drive of the screw conveyor) should be checked monthly and be corrected if needed. Per hydraulic motor 4 screws have to be loosened, the hydraulic motor has to be positioned new and the screws to be tightened again.



These four screws are to be loosened and after tightening the driving chain to be tightened again.

Spreader with electric spreading pattern adjustment

With spreaders equipped with electric spreading pattern adjustment (ESP), the piston rod has to be kept clean. It moves the spreading disc forwards and backwards and thus has to be cleaned regularly.

Spreader with drive via p.t.o. hydraulic pump

After each work assignment the p.t.o. hydraulic pump has to be checked for secure position so that it cannot turn. The oil level can be checked at the inspection glass on the side. Fill gear oil SAE 80 or 90, about 0.5l up to inspection glass height. Change gear oil, hydraulic oil and filter regularly.

Spreader with separate drive motor

Maintenance of motor according to producer specifications, see instruction. Disconnect battery in summer.

Spreader with damp salt equipment

After dismantling of spreader at the end of the season clean the brine tanks with clear water. Connect C-hose to hydrant perhaps and rinse the tanks thoroughly.

At the end rinse brine pump with Glysantine. The pump can remain filled with Glysantine over the summer.

Exchange of the sensors at the screw conveyors, the spreading disc and the chute

If no feedback arrives at the control, this can have many reasons. The last possibility is that the sensor is defect. Check the oil supply before and see whether the screw conveyors are blocked.

Loosen attachment and dismount sensor and supply cable. Mount new sensor. Connect supply cable with the appropriate clamp.

The sensor at the chute is a safety element. As soon as the spreading unit is folded upward the spreading disc rotation stops.



**Replace defective sensors immediately. Danger through rotating tools!
Park vehicle and remove ignition key.**

Wear parts

Wear parts are:

- the spreading disc
- both screw conveyors
- the cabin and the sprockets
- the bearings of the spreading disc and the screw conveyors
- all light bulbs
- all oil and water filters
- all hydraulic hoses are to be replaced every six years
- all hoses and sleeves
- cover tarpaulins and the outer valance at the back
- all springs, dampers and rubber buffers



Observe all safety regulations when you deal with hydraulic cables, couplings and parts in chapter 1. Hydraulic cables must not be repaired and are to be replaced immediately.

Repairs at the varnish



With varnish works there is a fire hazard according to the directive of flammable liquids. Danger of poisoning during varnishing work. Danger of injuries during polishing work with rotating tools.

After the end of the spreading season it is reasonable to repair damages at the varnish of the spreader equipment. Pay attention to danger notices! The particular varnish colour can be ordered from the company Kugelmann.

Welding work at the spreading equipment

The control must be connected during welding work. Otherwise disturbances at the processor and failure of the control have to be expected.

Error diagnosis

If the fault „Sensor disc error“ appears this can have several causes.

The spreading equipment does not receive any oil. Hydraulic onnections are not properly connected.

The screw conveyors are blocked.

The sensor is defect, a cable has been torn off.

Check sensor and sensor adjustment in the detail menu. See description „k-tronic detail menu“.

Error „Disc undersupply“.

The hydraulic system does not deliver sufficient oil.

Error „Disc oversupply“

Hand wheel at the flow divider block is open.

„Screw undersupply“

The hydraulic system delivers too little oil.

„Screw oversupply“

Hand wheel at the flow divider block is open.

„Undervoltage“

Check vehicle voltage of the carrying vehicle.

„Brine pump dry run“

Brine tank empty

Shut-off valve at the brine system is not open

Cover of the pass sieve is not screwed on sufficiently tightly

Error message „Brine sensor error“

The brine pump got stuck.

Sensor is defect or not properly set.

Check sensor via sensor adjustment menu. See relevant description k-tronic.

If the screws do not supply, the spreading material may be frozen or there may be a foreign object in the spreading material container. The screws can be moved backwards with the toggle switch or the reverse key at the slave housing. Before that stop the spreading disc at the control. Activate the toggle switch or the reverse key only for a short time to remove possible disturbance through lump formation. Manual operation is only foreseen for emergencies.



In case of danger from humans and equipment, the equipment has to be stopped immediately and the customer service must be informed.

The screw conveyors supply too little spreading material if the inappropriate spreading material has been filled and it does not follow.

Remove cover of the screw conveyor, attach protective grid immediately.

The causes are seldom mechanical. The driving chains of the screw conveyors or the hydraulic drive motors may be defect.



**Do not work while machine is running!
STOP MOTOR AND REMOVE IGNITION KEY!!!**

Brine system does not function. Check with manual emergency operation at the flow divider block whether it is an electric or a hydraulic fault. If the brine pump runs in manual mode, the fault has an electric cause. Check the set values on the k-tronic. Is the control valve supplied with electricity? If the hydraulic motor including the gear pump does not move, check whether it is supplied with sufficient oil. It is rare that the gear pump, the hydraulic motor or the nozzle are blocked.

If the applied spread material quantity or the spreading width does not coincide with the desired value, check the setting at the k-tronic. Please consult the section „Initial setting of the spreader“ in chapter 5. We recommend to check the settings before the season begins and to correct them if necessary.

Maintenance plan for mountable spreader



Do not work while machine is running!

STOP MOTOR AND REMOVE IGNITION KEY!!!

Maintenance and care works, overview plan	daily	weekly	monthly	annually	after end of season	according to hours of use
Visual check chute, spread chamber, spreading unit	X					
Brine equipm. and whole mounting of spreader unit	X					
Brine equipment and	X					
Oil levels at motor and hydraulics	X					
Torque support at p.t.o. hydraulic pump	X					
Visual check hydraulic hoses		X				
Chain tightening drive screw conveyors		X 1st month	X			
Bearingscrew conveyor greasing			X			
Check all wear parts			X			
Check brine unit for sealing			X			
Check of whole mountable spreader				X		
by expert						
Repair damage to varnish						X
Rinse brine pumps and and fill with Glysantine						X
Oil change with filter at vehicle or drive motor						see operating instructions Motor
Oil change with filterat hydraulic unit						follow producer specifications

Subject to changes

