QUICK MANUALS

- Most of the answers right at hand

Quality, strenght og efficiency

Sukup EUROPE®

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We are both proud and pleased that you have chosen a Sukup product/ plant.

We offer flexible and proven solutions based on more than 60 years of experience in producing and developing solutions for grain –drying, -storage and –handling.

We hope that you will be satisfied with your new product/ plant and that you will consider a Sukup product if you should be in need of additional capacity or an update of existing products.

Strong European dealer network

At Sukup Europe we have a clear focus on our European export market. Over the years, we have established a strong dealer network in a number of European countries.

Your local Sukup Europe dealer is always ready to advise you in relation to your Sukup products and does also offer you the necessary service when you are in need of assistance.

These Quick Manuals are thought as a simple reference book, where you find most answers - right at hand!

Kind Regards

Sukup Europe A/S & your local Sukup Europe dealer

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Introduction to the silo

<u>Always</u> read the quick manual through before use.

Before commissioning

- Check that the conveyor system works and that a service was made before filling the silo!
  - Check and possibly adjust belts and chains on the machinery.
  - Control oil level in the gearbox of the sweep auger and check all bearings in the unloading system for play, lubricate bearings etc.
  - You can sign a Service Agreement with Sukup Europe or your local dealer to ensure this.
- Check if the outlet operation works - open and close all outlets.
- Place the sweep auger in front of the center outlet (minus 10 cm) and check that the sweep auger stop plate is flipped out for later safty reasons.

- Check if the stirring system is operational
- Check that the unloading system is operational and listen for any unusual sounds.
- Clean fans and oil heaters of dirt if necessary. Place oil heater 1 m from the fan inlet.

During filling

(Read Quick manuals for further and important information)

- Adjust Grain pipes so that the grain is centered in the grain spreader inlet funnel. Uneven grain inlet = uneven spread and filling. An uneven filling may damage the silo and stirring system.
- Adjust the grain spreader so the grain is spread in an evenly layer throughout the silo. This is done by adjusting the spread wings.
- Start stirring and thereby drying at 1 m grain = READ "during the drying" section.
- If the silo is filled with grain, which has a moisture content above 20%, it is important to dry grain in steps. This is done by filling the silo 1 to 1.5 ring and then drying this quantity, before adding more grain into the silo. If this method is not followed, grain will stick to the silo wall and after the discharge you will have zones of poor/wet grain that must be removed manually.
- The silo can maximumly be filled until the grain reaches the spreader plates mounted on the stirring augers. The spread plates are mounted 10 cm above the stirring auger flights. They MUST be able to spread the grain away.
- Clean the roof on the outside and behind the roof ventils after filling, as there is acid in the grain dust.

During drying

(Read QUICK MANUALS for further & important information).

- The drying process with the operation of the fan, heater and stirring should run as long as there is grain filled in the silo and should be continued until the grain has the desired moisture content.
- Stirring system MUST be started as soon as there is a minimum of 1 m grain in the silo and should not be turned off before the drying/mixing is completed.
- There must be 1 m grain throughout the silo before starting the drying process with the operation of the fan and heat is allowed to start.
- Moisture samples must regularly be taken of the grain to moniture the drying stage. The grain will after aeration and stirring have an average moisture percentage (if the grain is well cleaned).

Note

DO NOT REMAIN IN THE SILO DURING FILLING AND DRYING

After completed drying

(Read QUICK MANUALS for further & important information).

- Always stop the stirring system so the stirring augers are placed as far as possible up against the silo wall.
- Perform service / control of the stirring system while there is an easy access to this (when the silo is full)
- The grain should be stored aerated and cooled. Always cool when there are more than 5°C lower outdoor temperature compared to the stored grain, until the grain is cooled to approximately 5°C.
- If the stirring system has not been in operation for a period it is IMPORTANT that all the stirring augers are manually turned to loosen the grain around the augers, before a new start up. If the grain is not loosened from the augers, there is a risk of the belt drive, boom and roof being damaged!(See "Stirring System - Manual")
- SERVICE is performed ON THE TRANSPORT FACILITIES AND SILOS while the capacity is available before the next harvest. Contact Sukup Europe to book service/signing serviceagreement.

Emptying the silo

(Read QUICK MANUALS for further and important information).

- Clean roof and roof ventiles inside the silo BEFORE unloading.
- Check that the sweep auger handle is pushed ALL THE WAY IN so that the auger is disconnected.
  It is always IMPORTANT to leave the silo with sweep auger disengaged.
- If there is more than 1 meter of grain in the silo, the stirring system must ALWAYS be started before the unloading system is started and continue to run periodic while unloading. This ensures that the stirring augers will not bend.
- Silo MUST always be emptied from the center outlet first. When there is no more grain from the center outlet, open the independent intermediate sump. Finally open the remaining intermedia outlet.
- NEVER open any outlets completely at once - take a little at a time until the unloading system is running optimally. Can easily be adjusted via ammeter (optional, easy to retrofit)
- When there is no more grain at the outlets, stop the unloading and stirring system.
  The sidedoor opens and you need to check to see if the sweep auger is FREE OF GRAIN.
- The unloading system MUST be switched off when the auger is engaged.

Grain Handling - Manual

Drying of grain should start as soon as possible. The best is by harvest or just after the harvest.
The drying process should ideally be terminated as soon as possible and preferably within 6-10 days after filling it into the silo. Particularly when the crops have a high moisture content (over 20 % moist).
Also remember that high grain temp. (also dry harvest) quickly can damage the grain quality!

1. Filling of the silo

- Adjust wings on the grain spreader so that the spread is as evenly in the silo as possible.
- The grain flow into the grain spreader must be centered IN THE MIDDLE of the spreader and at it´s best to have a small amount of grain bubbeling in the spreader.
- Offcentered grain flow will result in an unevenly filling of the silo. This can be reduced from bying an extra top cone (optional).
- The silo must MAX be filled up to the spread plates on the stirring augers. (See "Stirring System Manual")
- The stirring boom must under no circumstances be covered by grain.

2. Start of the stirring system

- Fan and stirring is started as soon as the height of the crop reaches a min. height of 1 m above the entire floor area.

- Stirring system should operate as long as the drying is in progress - To mix both moistured and dry grain and equalize the crop layer in the silo.

3. Silo drying generally

When drying of grain there are a few basic rules that generally must be followed.

- To achieve a drying effect in the silo, it must be ensured that the relative humidity of the outside air is lower than the balance that the air has in relation to current moisture content of the crop. See the Equilibrium table below.
- In general, drying of for example wheat down to a moisture content of 14.5 % is only possible when the relatively humidity of the drying air is maximum 65 %. (65 % relative humidity = 14.3 % moisture content in wheat).
- A low relative humidity can be difficult to achieve over many hours pr day by natural, whereby the drying time will be inappropriate long and slowly too (remove only a few grams of water pr m^3 airflow, without additional heat).
- Adding heat in front of the fan will reduce the relative humidity of the air.
- For every temperature rising of 1 °C of the drying air you decrease the relatively humidity with 4-5 %.
- IMPORTANT: you need heating to remove sufficient water from the grain, why we always recommend added heating when the moisture content is under 20-22 %. This results in a significant shorter drying time, and it is normally also cheaper! The quality of the grain increases too.
- In a drying silo with stirring system you can easily raise the outside air with 10°C by additional heat.
- In general - the more heat the shorter drying time! The drying temperature should not exceed 45°C, as this may damage the grain germination and risk of condensation with in and around the grain.

Equilibrium table

Relative humidity in% at 15 ° C

	40	50	55	60	65	70	75	80	85	90
Barley	**10,1**	**11,8**	**12,6**	**13,4**	**14,3**	**15,2**	**16,5**	**17,8**	**19,4**	**21,9**
Wheat	**11,0**	**12,2**	**13,0**	**13,5**	**14,3**	**15,2**	**16,3**	**17,3**	**19,0**	**20,5**
Oats	**10,0**	**11,3**	**12,0**	**12,5**	**13,3**	**14,0**	**15,4**	**17,0**	**19,3**	**22,6**
Rye	**10,7**	**11,6**	**12,4**	**13,2**	**14,0**	**14,8**	**15,8**	**17,0**	**19,0**	**21,5**
Canola	**5,7**	**6,6**	**7,0**	**7,5**	**8,0**	**9,0**	**10,0**	**11,3**	**12,7**	**14,3**

Water content in grain crops in %

4. Silo drying of crops with a moisture content of LESS than 20%

For the harvest of crops with a moisture content of less than 20 %, it is possible to fill the silo continuously while you dry the crop, if you meet the following specifications:

A. Start the filling of the silo.

B. Start the stirring system, fan and possibly heat source as soon as there is a minimum of 1 m crop throughout the silo.

C. Continue the stirring, fan and possibly add heating until the crop has been dried down.

D. After completed drying. Cool the crop to a min. outdoor temp. (best at night) – still with the stirring system running.

5. Silo drying of crops with a moisture content of MORE than 20%

For the harvest of crops with a moisture content of more than 20 % the silo must be filled step-by-step after the following procedure:

A. Start the filling of the silo.

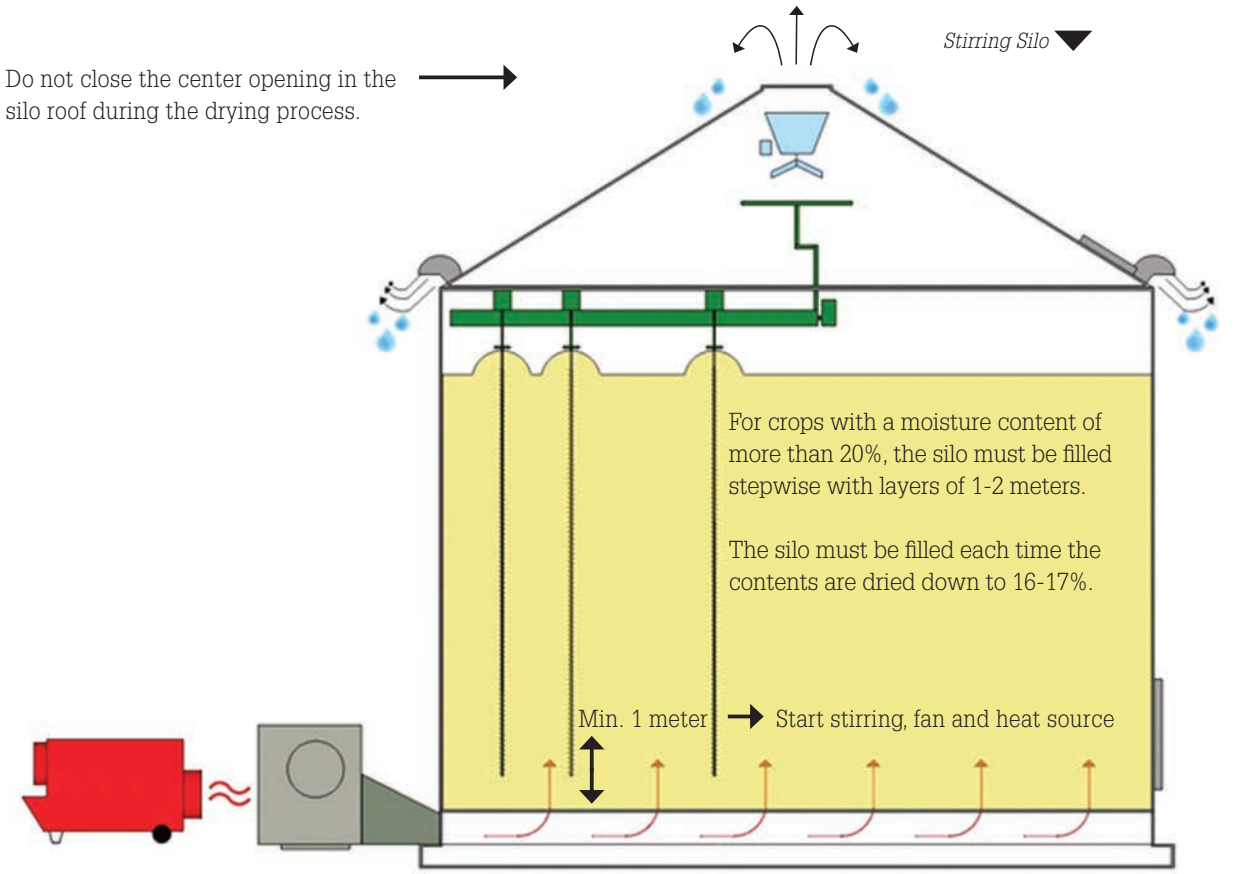
B. Start the stirring system, fan and possibly heat source as soon as there is a minimum of 1 m crop in the silo.

C. Stop filling when there is 1-2 m crop in the silo.

D. When the moisture of the crop is 16-17% water content, fill additional 1-2 m crop in the silo and continue to dry to 16-17% water content.

E. Continue with step 5.D until the silo is filled and then continue the drying process with additional heat until the crop has the desired moisture content.

F. After completed drying cool the crops to min. outdoor temperature (best at night)
- still with the stirrer running.

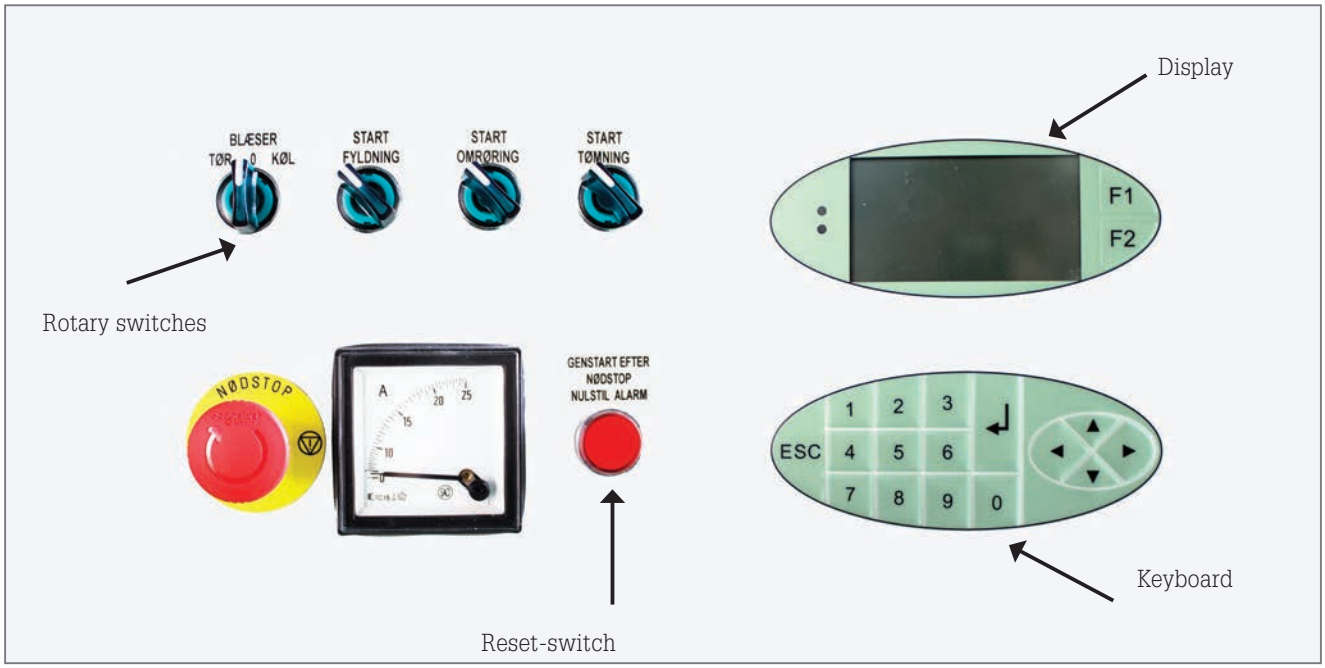


Sukup silo management

This is a manual for a standard Sukup Europe A/S silo management.

The control is provided with a combined humidity and temperature sensor for automatic control of silo functions.
On the following pages you will find information on the control functions in operating, settings of the process parameter and finally information on alarm / failure modes.

Control Panel



Overview – Silo control board

The operation of the silo control is done from a keyboard with a corresponding display and switches.

- Use display and keyboard to enter parameters into the control system and to navigate through the menus.
- Switches can be used to start or stop control functi ons.
- "Reset"-button lights up when an error occours on the system. Once the error is cleared, the control panel can be restarted by first pushing the "Reset" button and afterwards starting the plant again.
- The Emergency Stop must ONLY be used to stop the plant in an emergency!
- The Ammeter (extra equipment) shows the current ampere-load on the unloading motor auger.

Operating the system - Access control

Start screen appears on the display when the control is turned on at the main switch. It is not possible to navigate in the menus or operate the installation before the control board is unlocked.

Control 1 - with moist- and temperature sensor

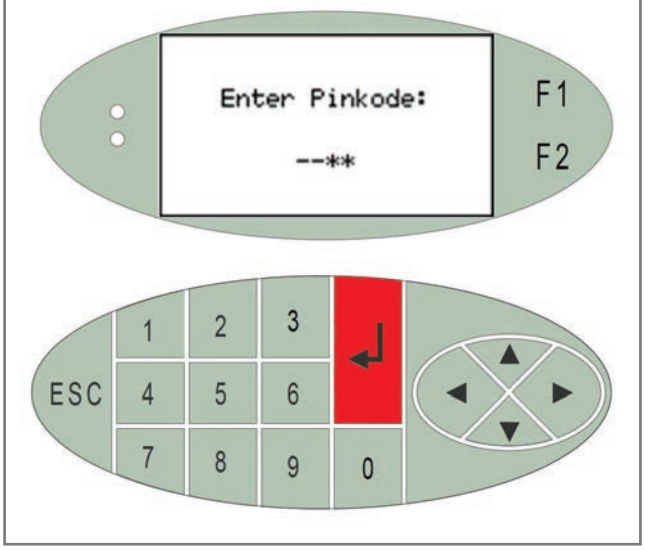
Access Control

The silo control board is locked and can only be unlocked by entering a PIN code which ensures that only authorized persons can access and operate it.
The start page shows two padlocks. If both are locked, both remote control (truck driver) and main control on the tablet front is out of function and therefore it is not possible to start the installation and to navigate in the menu.

In order to be able to enter any key, you need to enter either 'Enter' on the keyboard or on the truck driver remote. The display then shows 'Enter PIN code'.

Enter the PIN code (5152), and finish with "ENTER".

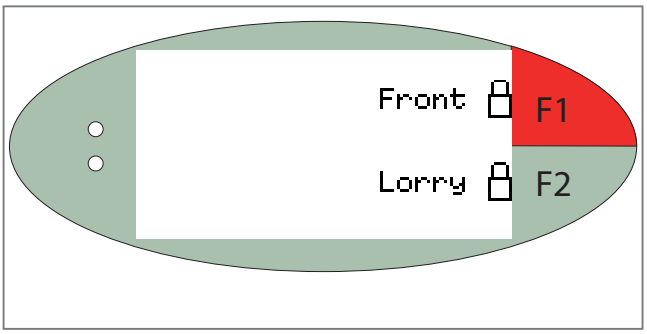
Display for accecs control with PIN number



The operation of the tablet front (door) and truck driver remote control can be unlocked by pressing first F1 and then second F2.

Then the padlock symbol appears as unlocked.

Press ESC to return to the start page.



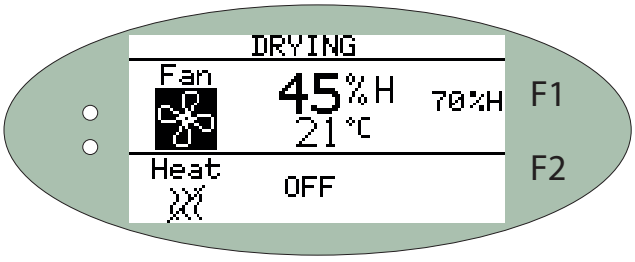
Operation of the tablet Front (Door) and truck driver remote control can afterwards be locked by first the F1 and second F2 in any menu without the use of PIN code.

Then the padlock symbol again appears as locked.

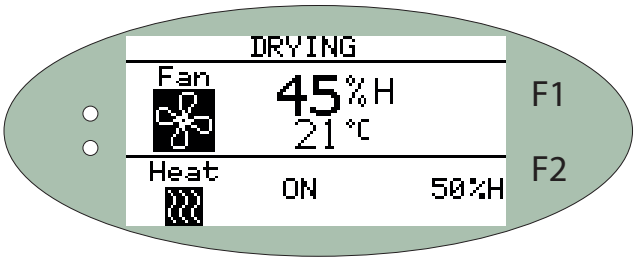
Operating the system – Drying

This function is used to dry the crop to the desired moisture percentage - with or without the addition of heat.
Dry-function is selected by turning the switch to 'Drying'.
Then the screenshot for "drying" appears.
In the top half of the display the operating symbol for the fan is now visible. The symbol changes color and is displayed as follows: , when the fan is in operation.
In the center, the current values for the outer moisture and temperature sensor are displayed and to the right, the set point for air humidity, which starts (enable) and stops the fan.
The bottom half of the display shows whether or not there is being dried with or without heating:

- heat is selected 'OFF'
- heat is selected 'ON', but is not in operation
- heat is selected 'ON', and in operation



Display for drying WITHOUT heat



Display for drying WITH heat

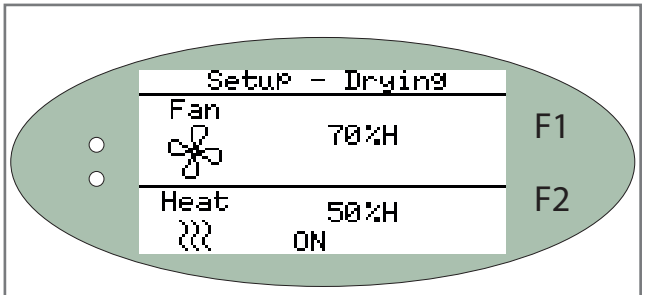
Drying Operation

The "Drying" function runs after different set points, depending on whether the heat is 'On' or 'OFF'. If the heat is 'OFF' the set point appears in the top half of the display. This set point stops the fan if the air humidity exceeds the set point.
If the heat is 'On', the fan runs continuously and the heat starts when the air humidity is above the set point, which appears in the lower half of the display.

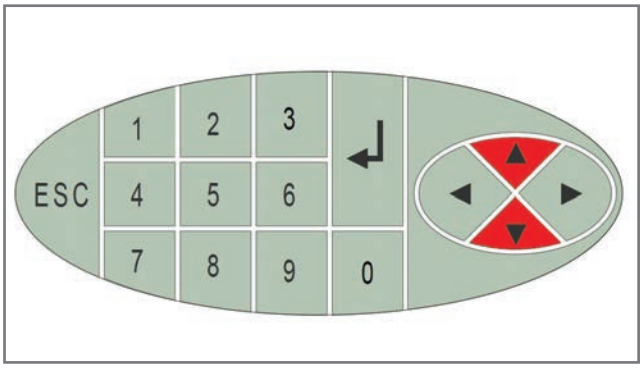
Setting the set points

By pressing the 'Up /down arrow' you can navigate between menus.

You are able to change the set points for this function under the menu "Setting – Drying". This is done by pressing 'Enter' and then select the field that will be changed, by using the arrow up / down. The selected field changes background color and a new value can be entered using the keyboard. Choose if the heat should be "ON" or "OFF" by pressing 'Arrow right' or 'Arrow Left'.



Setting of setpoints for drying

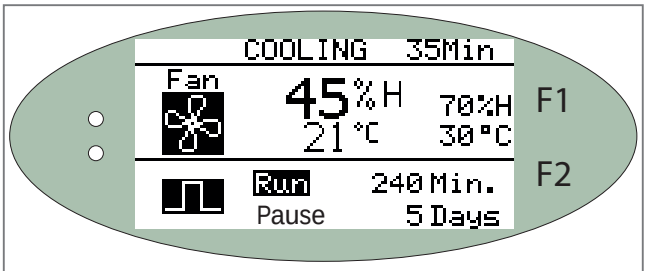


To confirm the entered value, press 'Enter' and then 'Esc' in order to navigate in the menus again.
The upper set point at the fan symbol is used when drying without heating. This stops the fan when the air humidity is above the entered set point.
The lower set point next to the heating symbol appears when drying with heat.
Hereby the fan runs continuously and the heat starts when the air humidity is above the entered set point.
In addition there is a margin of +/- 5%H, which ensures that the fan does not start and stop around the set point.

Operating the system – Cooling

This function is used to cool in intervals after the content is dried down to the desired water percentage.

The cooling function is selected by turning the rotary knob to 'cooling'. The screen display for "cooling" then appears and the top half of the display shows the operating symbol for the fan.
The fan symbol changes color and is displayed as follows: when the fan is in operation. The center of the screen shows the current values for the outer moisture and temperature sensor, and the right side shows the set point of the air humidity and temperature which starts and stops the fan.
The lower half of the display shows the operating ranges. 'Operation' (indicated in minutes) is the time that an operating period lasted and 'Pause' (expressed in days), is the time between the two periods of operation.
Range symbol changes color and is displayed as: when either operating or Pause interval is active.



Display with interval cooling - operation

Operation - cooling

When the 'cooling' is selected with the control switch, a timer is started on 10 Minutes, which delays the start of the fan.
This prevents unnecessary startup of the fan. The timer is visible in the right corner of the display and will start the installation after ten minutes, if the following starting conditions are available:

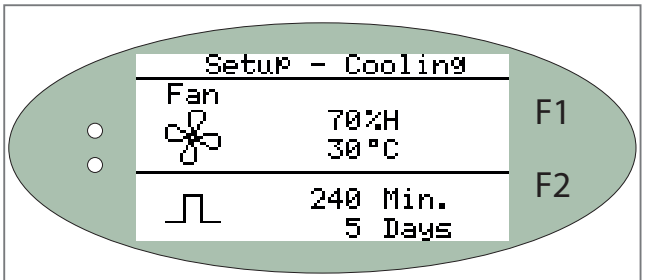
1. The air humidity is below the set point
2. The temperature is below the set point

If the starting conditions are not fulfilled, the fan will wait to start until these are met.
The humidity or temperature may also exceed the set point in the operational period, why the fan will then stop. The fan restarts from the same time position in the operation period when the starting conditions are met once again. At the end of the operating period, the pause period starts. At the end of the period, the operating period will resume if start conditions are met.

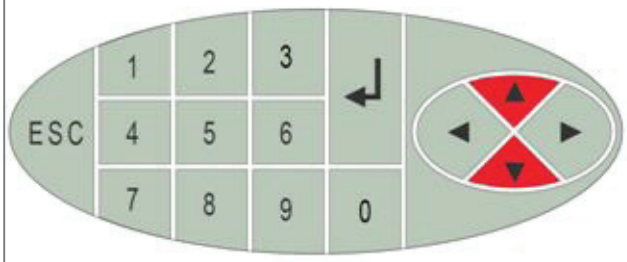
Setting set points

The menus can be navigated by pressing the 'Down Arrow' and 'Arrow up'. In the menu "Setting – Cooling" you can set the set point for this function. This is done by pressing 'Enter' and then select the field to change by using the 'Down Arrow' and 'Up arrow'. The selected field changes background color and a new value can be entered using the keyboard.

To confirm the entered value, press 'Enter'. In order to be able to change in the menu again, press 'Esc'.



Setting of setpoints for cooling



The top two lines are set points for the maximum air humidity and the maximum temperature that the fan may run at. This means that the fan only begins cooling when the humidity and temperature is below the entered set points.

In addition there is a margin of +/- 5%H and +/- 2°C , which ensures that the fan does not start and stop around the set point.
This means that the fan stops 5%H above the set point for humidity and 2°C above the set point for the temperature.
The two lower lines shows the time range where the upper time (indicated in minutes) is the time an operation period lasts and the lower time (expressed in days) is the pause time between two periods of operation.
If the pause time is set to 0 days, the fan will run if the air humidity and temperature allows it.

Operating the system – Stirring system & Boom motor

Stirring system

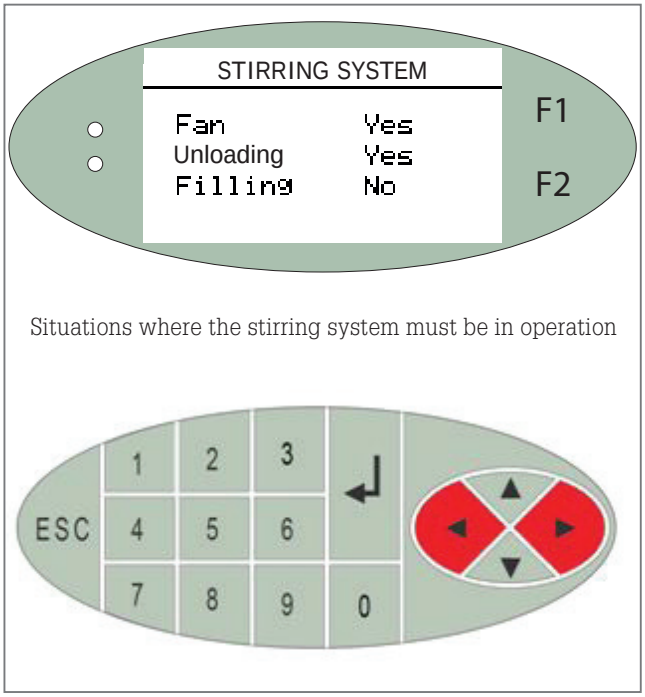
The menus can be navigated by pressing the 'Down Arrow' and 'Up arrow'. In the menu 'Stirring System', it is possible to choose which operating situations stirring system must be in operation.

Hereby it is possible to choose whether the stirring system should be operating when the fan, unloading system or the filling is in progress.

This is done by pressing the 'Enter' and afterwards choosing the area you want changed by using the 'Down Arrow' and 'Up arrow'.

The selected area changes background color and can be selected between 'Yes' and 'No' by pressing 'Arrow left' or 'Arrow right'.

Press 'Enter' to confirm the selection and then 'Esc' in order to be able to switch between the menus again.



Situations where the stirring system must be in operation

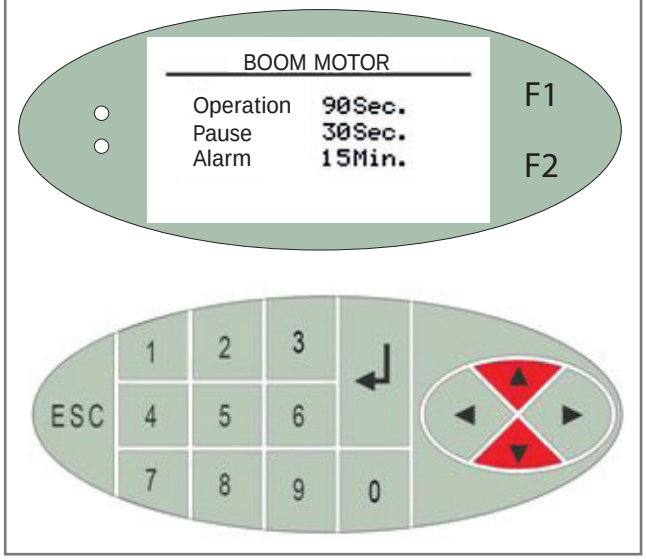
The boom motor – setting times

The menus can be navigated by pressing the 'Down Arrow' and 'Up arrow'. Under the menu 'Boom motor' it is possible to adjust the operating time, pause time and alarm time off the stirring system.

Times can be changed by pressing 'Enter' and afterwards choosing the area you want changed by using the 'Down Arrow' and 'Up arrow'. The selected field changes background color and a new value can be entered using the keyboard. Confirm the entered value by pressing 'Enter'. To change the menus again press 'Esc'.

The following display shows the recommended values.

Operation time for boom motor



'Operation' indicates the time that the stirring system boom operates before it pauses. 'Pause' indicates the time that the stirring system boom is stopped before it starts again. If the pause time is set to 0 sec, the stirring boom would only stop if one of the tilt switches is affected.

'Alarm' indicates the time the stirring auger must be tilted before the system is turned off.
If the stirring auger hangs vertically within the specified alarm time the system will continue operating after operating/pause times.

Operating the system

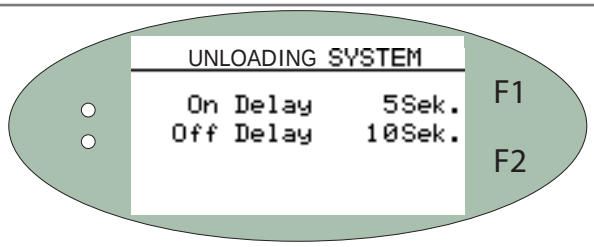
Unloading system

Here are the delays that are stated in both the starting and stop sequence on the unloading system.

The time settings are changed by pressing 'ENTER' and afterwards selecting the area that you want changed by using the 'Down Arrow' and 'Up arrow'.

The selected area changes background color and a new value can be entered using the keyboard. Confirm the entered value by pressing 'ENTER'.

To change the menus again press 'ESC'. The following display shows the recommended values.



Settings for unloading system

"Start-up time" indicates the time gone from the vertical auger starting until the horizontal auger starts.

"Run time / emptying time" indicates the time from the horizontal auger stops until the vertical auger stops.

Filling System (conveyor system)

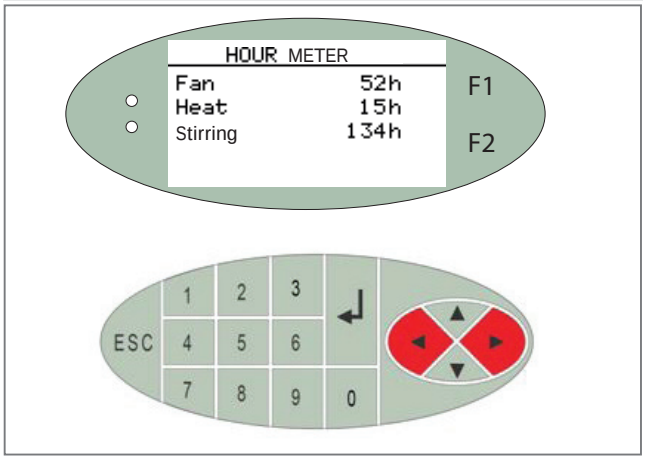
Here the operating times of the filling system are indicated, if this is fitted with a empty sensor in the intake pit. Three times can be changed:

- Intake sensor - Indicates the time the intake sensor must be free from grain until the idle stop time begins.
- "Run time / empting time" -sets the time between individual machine stops.
- Max time - indicates the amount of time the filling system must run until it is turned off.

The times are changed by pressing "Enter" and then selecting the field to be changed using "Down Arrow" and "Up Arrow". The selected section changes background color and a new value can be entered using the keypad.
Confirm the entered value by pressing "ENTER", hereafter it can be navigated again in the menus.
Return to start time by pressing "ESC".

Hour meter

The hour meter appears when you press the 'Arrow right' on the start screen. The hour meter counter all operating hours for the fan, heating and stirring. Press 'Arrow Left' to return to the start screen.



Alarm explanation

If an alarm occours, this will appear on the display. The view on the display varies depending on the type of alarm.

Alarm "tilt-switch"
This alarm will appear if tilt-switch has been affected for longer than the preset alarm for the boom motor. This alarm will stop all ongoing functions.
Check that the vertical stirring augers are hanging vertical and then press the 'Reset button', before the plant can be restarted.

Alarm "Thermal failure"
This alarm will appear in case of a thermal error on an engine. Examine the cause of the thermal failure before attempting to reconnect it again.
Then press 'Reset' on the thermal relay in the panel and afterwards the 'Reset' button on the panel front, before the plant is started again.
ALWAYS REMEMBER to find the cause of the thermal failure before pressing 'Reset'.

Alarm "Fuse Failure"
This alarm will appear if one of the fuses in the panel is switched off. Remember to find the cause of the blown fuse before pressing "Reset"

Alarm "Emergency stop/ Door failure"
This alarm will appear if the emergency stop is activated or if a door switch has been disconnected.

Alarm "Manual Operation"
This alarm will appear if the control is set to 'Manual'. This is changed in the panel where you find a range of control switches, where all engines can be operated manually.
The control switch 'Auto/Manual' is switched to auto again.

Reset alarm on the display
The alarms are reset on the display by pressing '0' or 'ENTER'

Operating the grain spreader

The key to spreading grain evenly is the angle of the spreaders and to adjust the grain flow directly in the center of the grain spreader.
The spreader is designed so that the angle of the spreader plates can easily be adjusted from the top of the spreader, which is done by turning the spread disc. (See Adjustment of the spread pattern).
The opening in the adjustment holes in the spreader plates determines how much grain is landing in the middle of the silo.
If the grain is too high in the middle, the holes in the spreader blades must be adjusted to minimize the outlet; if the grain level is too low in the middle, the holes must be adjusted to make the outlet bigger.
The Inlet funnel in the grain spreader is designed so to handle different capacities (t/h).
The capacity is controlled by the supplied rings.
3 rings are installed from the start; 6", 8" and 10".
Below is a guide line of ring capacity from normal wheat.

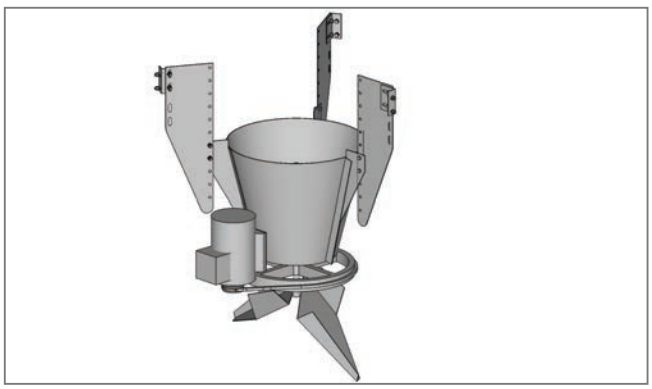
- If the system is running with a capacity from 0 t/h to 40 t/h, all three rings must be installed
- If the system is running with a capacity from 40 t/h to 70 t/h, the 6" ring should be removed.
- If the system is running with a capacity from 70 t/h to 100 t/h, the 6" ring and the 8" ring must be removed.
- If the system is running with a capacity from 100 t/h and more, all three rings must be removed.

It is very important that the spreader is filled dead center. This means that it may be necessary to adjust the piping from the transport system until the grain flow is directly in the center of the inlet funnel.

Please note that the grain typically travels approximately half around with the spread wing before leaving into the silo.

Note: There must be a maximum difference in the crop of 1.5 rings.

Grainspreader



Adjustment of the Spreader Pattern

The angle of the spreader plates depends on the diameter of the silo and how many tonnes/hour grains being loaded.
In order to obtain the best results, the grain spreader must be adjusted during filling.
When the silo is empty, start the use of the spreader with the spreader plates in horizontal position.
Then adjust the spreader plates up or down so that the grain hits the silo wall in the lower ring on the silo.

As more grain is reached, adjust the spreader plates upwards until the grain reaches the silo wall approximately 1 ring under the roof.

Adjustment of the spreader wings

Loosen the green lock handle (with counter nut) on top of the shaft.
The spreader disc under the green handle is rotated.
Upward means that the shaft can
pressed down further, thereby increasing the spreading wings. This is thrown away
the grain further out.
Note: When adjusting, weight must be placed on the spreader center shaft to see
a change. During operation of the spreader the centrifugal force will ensure that
The spread wings remain in the adjusted position.

After adjustment, the green lock lever is tightened again. Remember to tighten the counter nut.

"Start-up time" indicates the time gone from the vertical auger starting until the horizontal auger starts.
"Run time / empting time" indicates the time from the horizontal auger stops until the vertical auger stops.

Maintenance

Sukup Europe recommends that there will be a review and service at the plant once a year.

For all servicing, the safety switch for the entire system must be switched off and locked. For further information; see the full English manual via our website.

The following must be checked before using the grain spreader, however at least once a year:

The Spreader plate and the engine must be cleaned of dust and dirt.

Operation

There must be at least 1 m crop throughout the silo before the stirring system may be started.

- During stirring, the silo can be filled until the cone (produced by the stirring augers) reaches the spreader plates on the stirring augers.
  These are mounted approximately 10 cm above the end of auger flight. Overfilling may damage the stirring system since the overfilling may pull the stirring system down during discharge. (See "Introduction to system")
- The stirring system must run continuously during loading AND unloading (minimum 1 m crop).
- If the stirring system has not been operating for a period of time, it is VERY IMPORTANT that all stirring augers are rotated MANUALLY to loosen the crop around the augers. If the crop is not loosened around the augers, it is likely that the boom + roof being damaged when starting up!
- If there is more than 1 m crop in the silo and you need to empty the silo, the stirring system must always be started before the unloading system is activated.
  This ensures that the stirring augers do not get bend.

The stirring system involves a boom that run on a wall track and brung forward the stirring augers.On the boom are a number of augers, depending on the size of the silo. If one of the augers gets behind the others, possibly due to an area with solid grain, a tilt switch is installed for each auger as an additional security.
The boom motor will stop if one tilt switch is activated.

The stirring augers will always operate when the stirring system is in operation, but the stirring boom is set as standard to run in 90 sec. after which it pauses for 30 sec and then continues to run in 90 sec. again etc.

This is a setting that allows the augers to straighten themself in the pause time and avoid to “fall behind”.

Maintenance

Sukup Europe recommends that the whole installation is beeing reviewed and serviced once a year.

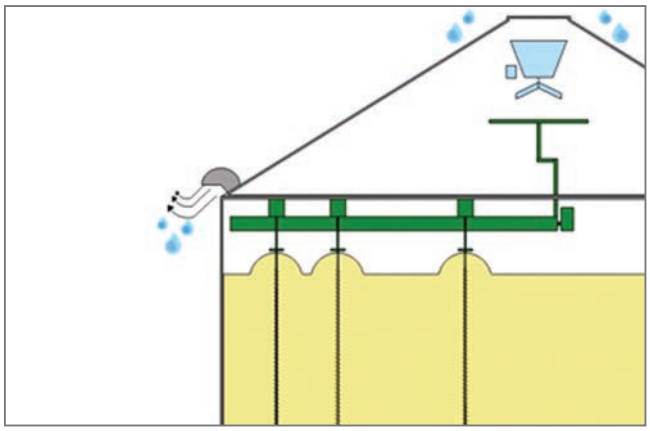
For all servicing, the safety switch for the complete system must be switched off and locked.

For further information; See the full English manual via our website.

The following is performed during the season:

- Clean the stirring system for grain and dust, especially the electrical motor cover and its cooling blades.
- Check safety pins (There are 2 extra included, which are attached to the gear motor).

Stirring system



6” Unloading System

Please be aware that the sweep auger is located almost right before the side outlets (so the flow doesn’t block) and that outlets are closed before the silo is filled.
In addition, the mechanical stop plate must be turned out from behind the auger, as an extra safety feature.

Operation

1. The unloading system is started using the control panel plus optional external truck loading panel (optional). When the unloading system is started then first the vertical and then the horizontal unloading auger will start up.
   NOTE: We highly recommend to operate the stirring augers at the same time using the unloading system, to avoid bended augers. Only operate them while free flow to center.

2. Slowly pull the drawbar (A) to open the center outlet. The center outlet needs to be opened step-by-step as the ammeter (optional) is monitored and does not excess max amps according to the engine amp level. Alternative listen to the electrical motor load.
   Caution: There is different flows in crops!

3. Between the loads, start and stop direct by the control panel. IF there is more than 48 hours till next load then close the center outlet BEFORE the unloading system is stopped, to clean the tube. (Don´t close it with sweep auger engage). When the unloading system is restarted, the center inlet is opened step by step - as before.

4. When the silo center is emptied of grain, move the operating lever to the side outlet drawbar **(B)**, which allows additional grain flow to the unloading auger. Open it also step by step to prevent over flow and stop.

5. When the side outlets are empty, switch off the power for the unloading system. Then close the side outlet by pressing back in the drawbar **(B)** against the silo.

6. Then open ONLY the center outlet (must be completely open). Open the silo door and verify visually that the sweep auger is exposed = no grain on top. The sweep auger is started by flipping the lock to the side and pulling the clutch rod (C) until the clutch in the center outlet is engaged = approx. 10 cm or 4”.
   To avoid damage to the clutch, the power must ALWAYS be disconnected before connecting/ disconnecting the sweep auger. *You may have to try twice before the clutch teeth fit each other.*

7. Start the unloading system again with the sweep auger connected. The center outlet must remain fully open while the sweep auger is operating.

8. After finished unloading, place the sweep auger right before the side outlets, the rod **(C)** is turned back to start position and is locked again with the coupling lock. Check that the outlets are closed before the silo is filled again.

Maintenance

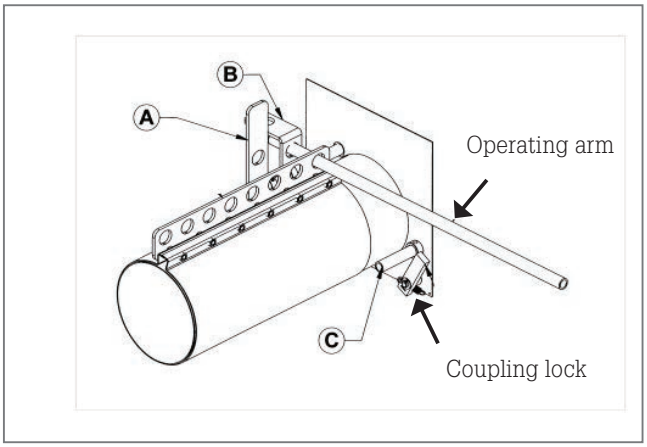
Sukup Europe recommends that the installation is being reviewed and serviced once a year.

During all servicing the safety switch for the entire plant should be disconnected and locked. For further information; see the full English manual via our website.

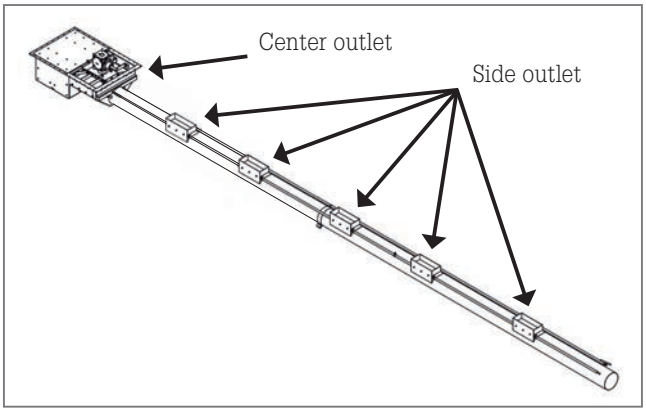
Before filling the silo, perform following:

- Check all gear, chain, tooth sprocket, bearings and auger flights. Clean the sump and outlet so they run nice and easy.

Operating device for 6” unload system



Placement of outlet



8” and 10” Unloading System

Please be aware that the sweep auger is located almost just above the side outlets (so the flow doesn’t block) and that outlets are closed before the silo is filled. In addition, the mechanical stop plate must be turned out from behind the auger, as an extra safety feature.

Operating

1. The unloading system is started using the control panel plus optional external truck loading panel (optional). When the unloading system is started then first the vertical and then the horizontal unloading auger will start up. NOTE: We highly recommend to operate the stirring augers at the same time using the unloading system, to avoid bended augers. Only operate them while free flow to center.

2. To open the outlets in the silo floor, use the rack and pinion (A). This opens either the center alone or the center and side outlets together, depending on where the pin is mounted. Start with only opening the center outlet. This is done by placing the pin into hole (B1) and turning the rack and pinion while the unloading system is operating. The center outlet needs to be opened step-by-step as the ammeter (optional) is monitored and does not excess max. amps acording the engine amp level. Alternative listen to the electrical motor load. Caution: There is different flow in crops!

3. Between the loads, start and stop directly by the control panel. IF there is more than 48 hours till next load then close the center outlet before the unloading system is stopped, to clean the tube. (Don´t close it with sweep auger engage). When the unloading system is restarted, the center inlet is opened step by step - as before.

4. Then the independent intermediate sump (optional from 2017) can be opened using the draw bar (C). When no more grain flows into the side outlet, close the outlet again. The pin is moved to the hole (B2), after which both the side and center outlets are opened together. While the system is running, open it also step by step to prevent over flow and stop.

5. When the side outlets are empty, the power for the unloading system must be disconnected. Then close all outlets and open only the center outlet (MUST be completely open). Open the silo door and verify visually that the sweep auger is exposed = no grain on top.

6. Hereafter connect the sweep auger by flipping the clutch lock (D) to the side and pull out the connecting rod (E) until the clutch in the center outlet is engaged = aprox 10 cm or 4”. To avoid damage to the clutch, the power must ALWAYS be disconnected before connecting/disconnecting the sweep auger. You may have to try twice before the clutch teeth fit into hit other.

7. Start the unloading system again with the sweep auger connected. The center outlet must remain fully open while the sweep auger is operating.

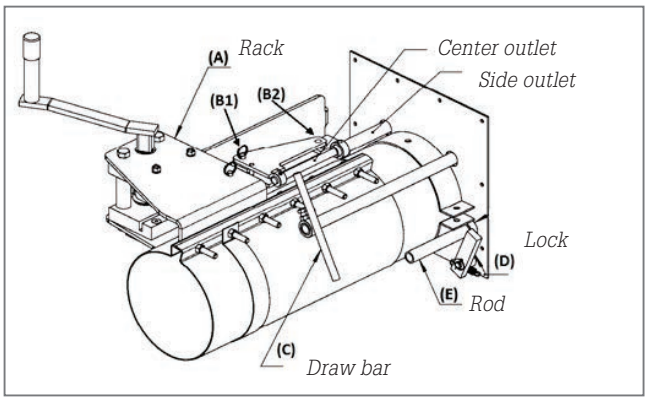
8. After finished unloading, place the sweep auger almost above the side outlets, push the rod **(E)** back to the starting position and lock again by flipping back the lock **(D)**. Check that the outlets are closed before filling the silo again.

Maintenance

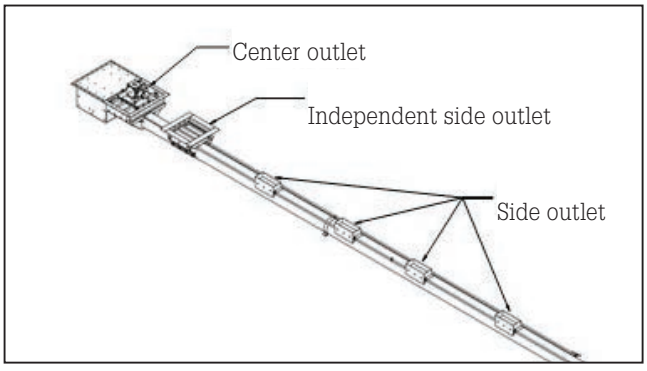
Sukup Europe recommends that the installation is being reviewed and serviced once a year.
During all servicing the safety switch for the entire plant should be disconnected and locked. For further information; see the full English manual via our website.

Before filling the silo, perform following:
Check all gear, chain, tooth sprocket, bearings and auger flights. Clean the sump and outlet so they run nice and easy.

Operating device 8” og 10” tunload system



Placement of outlets

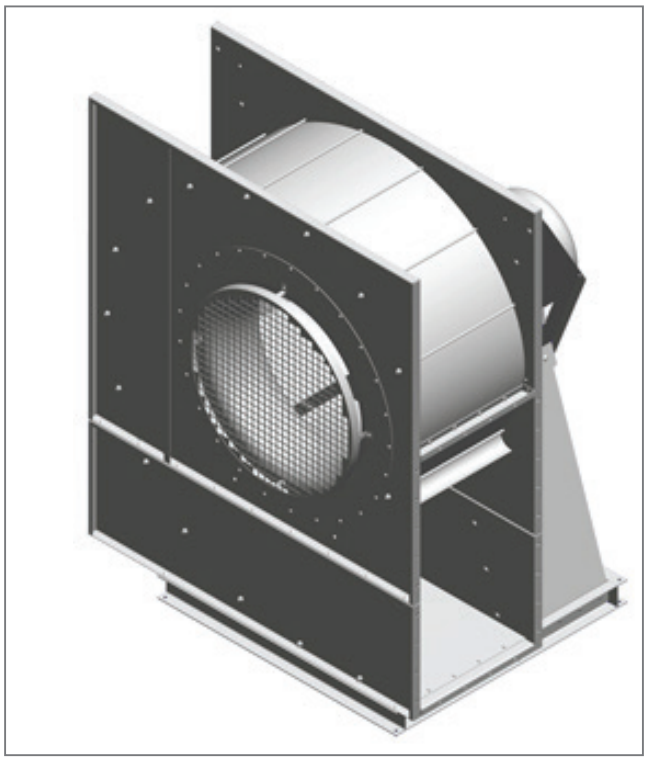


Fan

Operation

- The fan must NEVER be started unless there is a minimum of 1 m crop in the silo, as there is a high risk that the floor supports will shift or overturn
- If the flow direction is incorrect, the fan will still bring air into the inlet, but only a fraction of the right amount. The correct flow direction is shown on the fan.
- The fan is started and stopped from the control panel. For more information on manual and automatic start or stop of the fan, please see the manual for Controls panel.

Fan



Maintenance

During all servicing the safety switch for the entire plant should be disconnected and locked.

For further information; see the full English manual via our website.

The following should be checked / performed annually:

- Clean the fan wheel from any dirt or foreign material on the fan blade.
- While the safety switch is disconnected, turn the fan wheel by hand to ensure that it rotates freely. Also listen for any unusual sounds in the bearings of the electric motor.
- Check the fan's electrical installation for loose connections, exposed wires or damage caused by rodents.
- When starting the fan in frostbite, there may be ice on the lower fan blade, which can cause excessive vibration and then damage to the fan.

After the season:

- Clean the fan wheel and the fan house for dirt and foreign objects.
- Maybe cover the fan intake to protect against weather and wind so that no dirt or foreign material can enter.

Oil Heaters

Please note

For SE or SD oil heaters (yellow):

- Always follow local laws and regulations when using the oil heater.
- It is the responsibility of the user to comply with local fire authorities' requirements.
- Before the oil heater is taken into use, the power plock might have to be replaced to full fill national law of the electrical connector

For Jumbo or Farm oil fans (red/galvanised):

- The oil heater must be installed and adjusted by an OR certified oil burner technician.
- It is statutory that the certificate on the burner must be renewed once a year. This ensures, among other things, optimal and economic operation of the oil heater.
- It should be noted that Sukup Europe A/S is not OR certified so we refer to:
  - Gastech-Energi - tel. +45 7010 1570

Operation

For SE or SD oil heaters (yellow):

- The supplied instruction for the SE / SD - FI / FD - EC / GE oil heater must be read before start-up!

For Jumbo or Farm oil heaters (red/galvanised):

- The supplied instruction for the Jumbo / Farm hot air units must be read before start-up!

Note: please see the corresponding manual for appropriate distance between fan and oil heater.

Maintenance

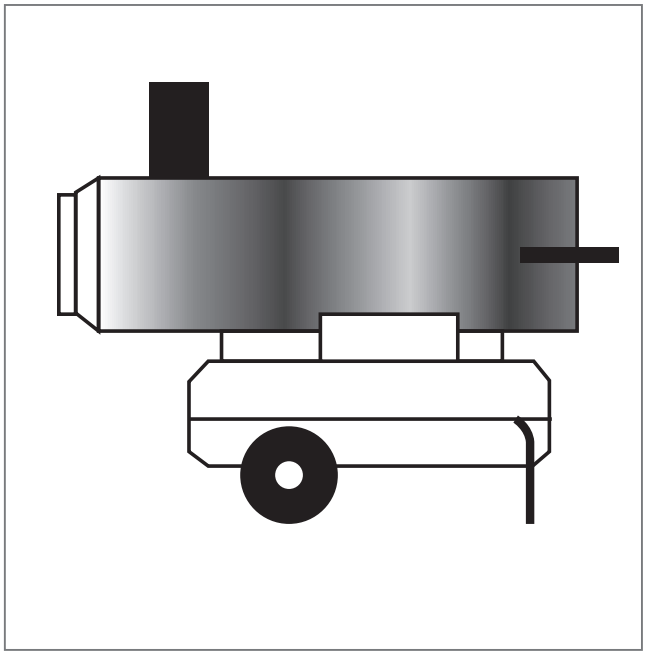
After the season:

- It is recommended to clean the oven with compressed air and then dried off. Afterwards it should be stored indoor until next season.

Before the season:

- It is recommended that the oil heater each year is serviced by an oil guy's installer. This will ensure an optimal operation and will reduce operating inconvenient stop in the season.

Oil Heater



Chain elevator

Operation

For the proper operation of the chain elevator the following must be ensured before starting:

- Do not load more material in the elevator than the registrated capacity of the elevator. This ensures that the elevator is not overloaded.
- The elevator must be started before adding any material and stopped when the elevator is empty again to avoid any starting problems the next time it's being used.
- If the elevator is blocked it must be drained for material in the return pibe (i.e. the tube where the chain runs down). This must be done through the inspection hole.
- The blocking will happen if the outlet is blocked, or if other maschinery after the elevator stop. Before restarting make sure that the thermal relay has cooled to ensure proper operation.
- Check the in- and outlet is cleaned.
- Check that the elevator chain is properly tightened.
- Check the V-belt of the engine if this is with belt drive.

Chain elevator

Maintenance

Sukup Europe recommends that the plant is beeing reviewed and serviced once a year.

For all servicing, the safety switch for the complete system must be switched off and locked.

For further information; See the full English manual via our website.

1. Check the bearings and lubricate – Bearings should be replaced if there is play or if the bearings gets warm from over heating.

2. The chain is tightened with the adjusting bolts at the motor end which moves the gear wheel. The chain runs in enclosed spaces, why it must be ensured that the chain is tight on the gear wheels in both ends.

   –checked/adjusted at startup after 50 operating hours.
   – checked/adjusted by intensive use of every 200 hours of operation or at least 1 time per season.

3. If the engine is fitted with belt drive, tighten the belt so that the belt does not slip on the pulley
   - This is done with the adjusting bolts on the motor mounting plate.
   - checked/adjusted at startup after the first ten hours of operation.
   - checked/adjusted by normal use every 3 months. By intensive use check each month.
   - When the belt can not be tightened further, it must be replaced.

4. Clean the motor from dust and dirt so that the engine cools optimally.

5. Cover motor and inlet after use to protect against weather and wind.

6. Empty the elevator after use and clean for materials in the elevator foot.

7. If the elevator is fitted with side augers, check for wear and other defects.

Bucket Elevator

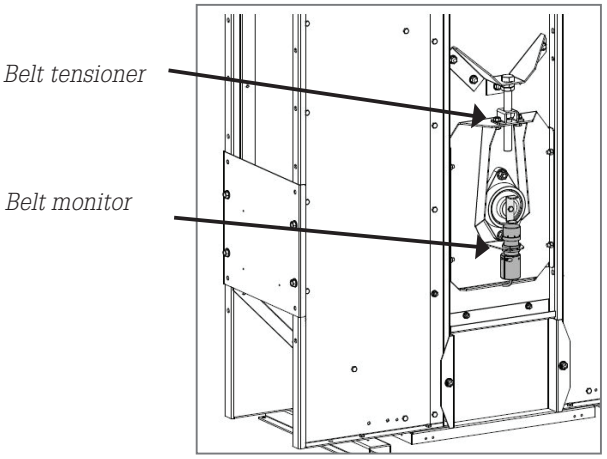
Operation

Before correct operation of the bucket elevator, ensure the following before startup:

- Do not load more material in the elevator than the registrated capacity of the elevator. This ensures that the elevator is not overloaded.
- The elevator must be started before adding any material and stopped when the elevator is empty again to avoid any start up problems.
- If the elevator is blocked it must be drained for material in the return pipe (i.e. the tube where the buckets runs down). This must be done through out the elevator foot.
- The blocking will happen if the outlet is blocked, or if other maschinery after the elevator stop, or if the discharge plate in the elevator head is not adjusted correctly.
- Before restarting make sure that the thermal relay has cooled to ensure proper operation.
- The backstop is mounted on the elevator head and ensures that the elevator belt does not run backwards in the event of breakdown with full buckets.
- The speed monitor (extra equipment) is mounted on the elevator foot and stops the elevator if the belt starts to slip.

- Check that the elevator belt is tight.

Bucket Elevator



Maintenance

Sukup Europe recommends that there will be a review and service of the plant once a year.

Stop the machinery and turn off electric power before attempting any type of maintenance work.

For further information; see the full English manual via our website.

1. Check the bearings and lubricate - replace bearings if there is slack or if the bearings will overheat.

2. Check the splash guard in elevator head outlet regularly, since this may be altered and decrease the capacity
   – this must be adjusted so the distance between the splash guard and the bucket mounted immediately after the belt tensioner is 10 mm.

3. Tension the bucket belt with the belt tensioner on the bucket belt first. After thath tension the bucket-belt with the tensioning bolts on each side of the elevator boot.
   It is important that the adjustment is the same on each side of the elevator foot.
   Ensure the bucket belt is centred on the slatted pulleys.

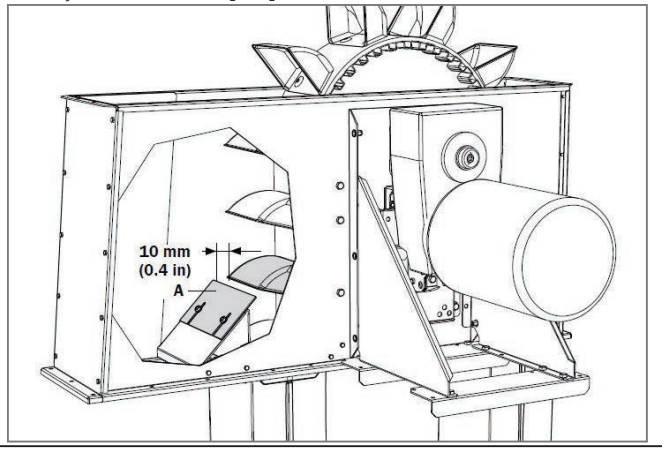
   - checked/adjusted at startup after 50 operating hours.
   - checked/adjusted by intensive use every 200 hours of operation or at least 1 time per season

4. Empty the bucket elevator after use and clean for material using the clean out hatch in the elevator boot.

5. Clean the motor from dust and dirt, so that the motor will cool optimally.

6. Cover motor and inlet/outlet after use to protect against weather and wind.

Adjustment of scraper plate



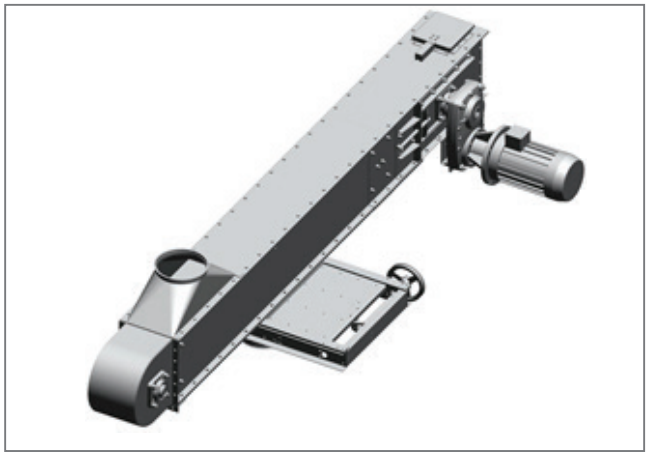
Chain conveyor

Operation

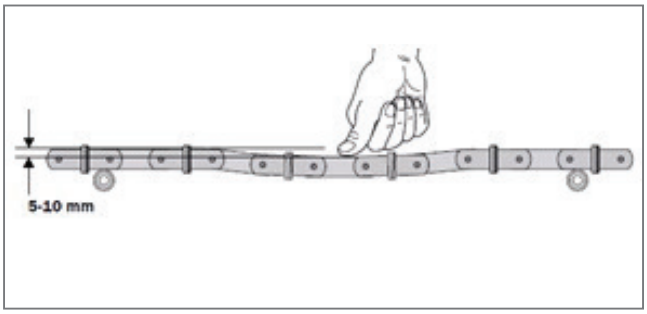
For correct operation of the conveyor, the following must be ensured before startup:

- Do not add more material to the conveyor, than the capacity of what the conveyor is limited to. This ensures that the conveyor is not being overloaded.
- The conveyor must be running before the supply of material and must not be stopped until the conveyor again is empty.
- If the conveyor is mounted with an overload sensor, this will stop the conveying system if there is a blockage at the outlet. Check the overload sensors before start-up by activating these manually.
- In case of a blockage the conveyor must be emptied by all the intermediate outlets, enabling the motor to be burdened as little as possible, when restarting the conveyor.
- Before restarting the conveyor it must be ensured that the thermal relay is cooled down to ensure proper operation.
- Check that the chain is properly tensioned.
- Check the belt

Chain conveyor



Adjustment of the chain



Maintenance

Sukup Europe recommends that there will be a review and service of the plant once a year.

Stop the machinery and turn off electric power before attempting any type of maintenance work.

For further information; see the full English manual on our website.

1. Check the bearings and lubricate - replace bearings if there is slack or if the bearings will overheat.

2. Check the return rollers regularly, that they are running unhindered. If the return rollers overheat, all the rollers must be checked/ replaced.

3. Adjust the tension of the chain with the tension screws at the drive end of the conveyor. The chain should be tensioned so that the chain between the two return rollers have a tolerance of 5-10 mm.

   - checked/adjusted at startup after 50 operating hours.
   - checked/adjusted by intensive use every 200 hours of operation or at least 1 time per season.

4. Lubricate the chain with chain oil, when the con veyor is not to be used for long periods.

5. If the engine is fitted with a belt drive, these need to be tightened, so that the belt does not slip on the pulley. This is done with the tensioning screws on the engine bridge.
   - checked/adjusted at startup after 1 day.
   - checked/adjusted by normal use every 3 months. By intensive use each month.
   - When the belt can't be tightened any further, then it must be replaced.

6. Empty the conveyor after use and clean for material.

7. Clean the motor from dust and dirt, so that the motor will cool optimally.

8. Cover motor and inlet/outlet after use to protect against weather and wind.