TRANSPORK® DRY FEEDING SYSTEM

Ø50,8 – Ø63,5 MM

PART 2 USER MANUAL

981 000 692
Ver. 7.00
23-04-2013

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

Contents

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6. Instruction Manual

6.1 Start/stop of system

There are different procedures for start/stop of the system, depending on the type of controller used. Follow the procedure in the controller manual.

6.2 Adjustment of hopper

When filling feed into the system, you must adjust the hopper so that the filling of the pipes is done correctly. The filling is adjusted by adjusting the handle under the hopper (pos. 1, Fig. 48). After loosening the handle, it is pushed slowly from pos. “min.” towards “max.”, until you get a filling of 50-60%. When the adjustment is satisfactory, re-tighten the handle. Be aware that the proportioning cannot be closed completely, and that the adjustment can only be altered, while the system is operating, in order to secure against over-filling and against jamming of the throttle.

It is important to adjust correctly, as too much feed may overload the system, whereas too little feed may cause problems with faulty signals from the stop system.

Remember to check the filling currently - especially at change of feed.

If stone drops are installed please remember to remove the sorted out foreign bodies preventing the outlet from blocking.

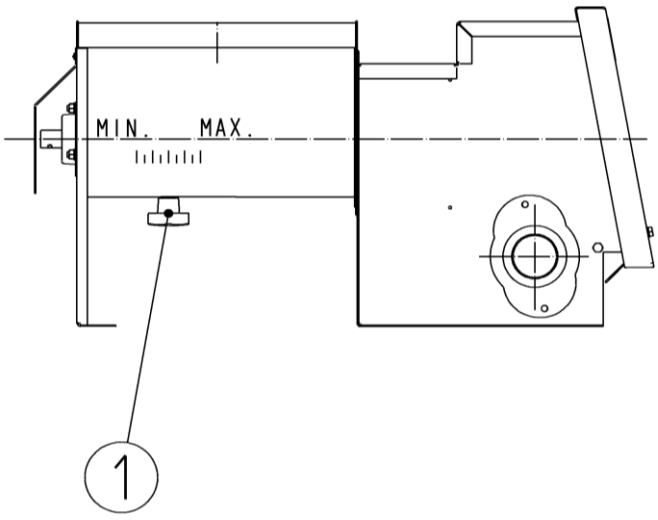


Fig. 48 Adjustment of hopper

Please note that the silo shutter must be in closed position when feed is filled into an empty silo in order to prevent the feed from piling up in the hopper.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.3 Adjusting the hopper – transparent cover

The hopper is fitted with an Ø100mm auger with 100mm pitch. The amount of feed dosed into the feed pipe is constant and NOT adjustable.

The motorized hoppers are fitted with a geabox suited for the dimension of the feed pipe (Ø50.8mm, Ø60.0mm and Ø63.5mm)

The movement of the vibrator plate can be adjusted by moving the small nylon wheel driven by the auger

Remember to remove foreign objects from the stone separator in order to avoid clogging

Please be aware that the throttle in the silo must be closed when blowing feed into the silo. This helps to avoid the feed jamming in the hopper.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.4 Indicator and tightening of the feeding-wire – Transpork drive unit

The side of the drive unit is equipped with an indicator where the wire tension can be watched currently without having to dismantle the front plate. The indicator consists of a blue C-profile (pos. 1, Fig. 49) with coloured scale. A yellow indicator (pos. 2, Fig. 49) slides inside the profile. As described in a previous section the wire tension is adjusted by turning the hand wheel (pos. 3, Fig. 49) until the yellow indicator is flush with the end of the blue C-profile.

The feeding-wire will stretch during operation, but as long as the indicator moves in the green area, an adjustment is not necessary. The hand wheel is re-tightened when the yellow indicator reaches the red line. By constantly keeping an eye on the indicator, you will have an impression of the present wire tension. Tightening on the hand wheel can be carried out many times, but when the indicator is so far away from the cabinet of the drive unit that the wide red area on the scale can be seen, the feeding-wire must be shortened.

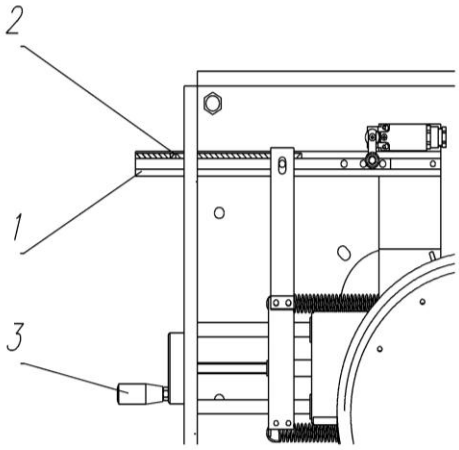


Fig. 49 Indicator on the side of the drive unit

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.5 Indicator and tightening of the feeding-wire – MiniPork drive unit

The side of the drive unit is equipped with an indicator (Pos. 2 fig. 49A) where the wire tension can be watched continuously. The wire tension can be adjusted by turning the handle (pos. 1, fig. 49A). The spring is tightened until the handle almost entirely covers the green area on the indicator.

The wire will stretch during operation, but as long as the indicator moves in the green area, an adjustment is not necessary. The handle is re-tightened when the indicator reaches the red area. By constantly keeping an eye on the indicator, you will have an impression of the present wire tension. Tightening of the handle can be carried out many times, but when the tension wheel (Pos. 3, fig. 49A) reaches the back of the housing, the wire must be shortened.

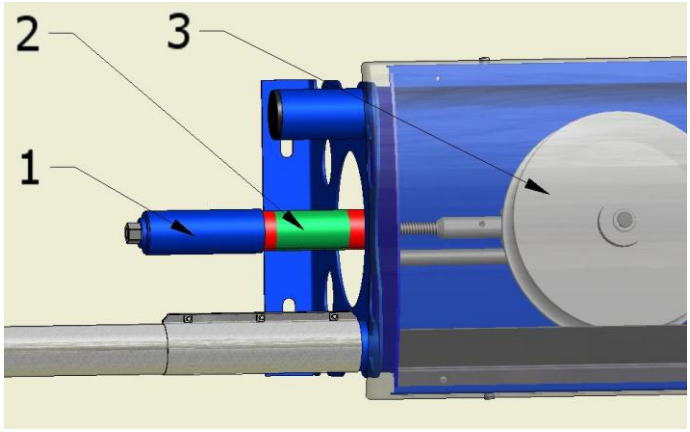


Fig. 49A Wire tension indicator of the MiniPork drive unit

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.6 Operation of volume dispensers

6.6.1 Operation

Opening the throttle, placed just under the transport pipe, starts filling of feed into the volume dispenser. The quantity to be filled into the dispenser is regulated by dislocating the telescope up or down via the operation handle on the dispenser. The best regulation is made when the dispensers are empty and before the feed system is restarted.
The quantity is read on the litre scale by flushing the lower side of the blue triangular marking in connection with the replaceable telescope (see Fig. 50).

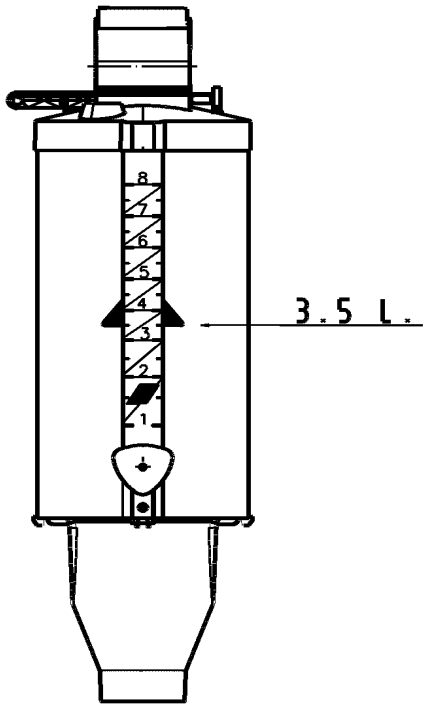


Fig. 50 Reading of scale

6.6.2 Control weighing

It is very appropriate to control weigh frequently - and always in connection with change of feed type - to be sure that the feed quantity corresponds with the expected. A certain deviation must be expected, because the angle of slide of the feed can vary much, depending on the feed type.

In order to determine the specific weight of the feed type, three volume dispensers, placed in the middle of the system, are adjusted to a number of litres corresponding to half full. The feed system is started, until the bins are filled. The three portions are emptied and weighed. The weight is found in kg per litre.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

Example:

1. Three 8 litres volume dispensers are set on 4 litres - total 12 litres.

2. The three portions weigh (2.75 + 2.91 + 2.85 kg = 8.51 kg).

3. Average weight (8.51 kg: 12 litres = 0.71 kg/litre).

4. At a wanted quantity of 3.2 kg per feeding, the volume dispenser is set on 3.2 kg : 0.71 kg/litre = 4.51 litres.

Example of trickle feeding:

1. Three 8 litres volume dispensers (at trickle feeding 11 litres content) adjusted on 6 litres - total 18 litres.

2. Weight of the three portions (4.50 + 4.12 + 4.37 kg = 12.99 kg).

3. Average weight (12.99 kg : 18 litres = 0.72 kg/litres).

4. At a required quantity of 6.4 kg per feeding, adjust the volume dispenser to 6.4 kg : 0.72 kg/litre = 8.89 litres.

6.6.3 Release

The feed portion is released by turning the release arm on top of the dispenser. In most cases the release arms are linked together in order to release several volume dispensers simultaneously. The construction of the release system is described elsewhere in this manual.

When the feed is to be released manually, you pull the handle slightly until the pawl tilts enabling it to pass the lock plate, Release the feed slowly in order to avoid accumulation in the pipes.

When the volume dispensers close, take care that the pawl locks correctly so that the feed is not released involuntarily.

6.6.4 Automatic release Model 2007 and before

In systems with automatic release a feeding sequence starts when the filled volume dispensers via the release are emptied into the animal troughs. Then the system starts to fill up for the next feeding. However on automatic feed release/start of system it is possible to release the feed manually on the release control before the preset time in order to have a little more time to adjust.

The release opens the volume dispensers slowly step by step to avoid accumulation in the hopper. The dispensers are kept open for 5 minutes, before they re-close, and the system re-starts the filling so that the dispensers are filled for the next feeding.

The release can be operated manually via the buttons (pos. 3 and 4, fig. 47) to run in open or closed position - e.g. for control of the release system. The manual operation can also be used, if you want to release the feed before the automatics in order to get a longer time for adjustment of the volume dispensers, before they are re-filled. It is a demand that the release is returned, before the automatics start the next feeding, as else the controller will give alarm.

The release is mounted with a control switch in each outer position, so that it is possible to check whether the volume dispensers open or close, as they must. The return switch (pos. 5, Fig. 47) must be activated when the volume dispensers are closed, and the end stop

switch (pos. 6, Fig. 47) must be activated when they are open. If the release does not reach the correct position within 2 minutes - e.g. because of a blocked system transmission - the controller stops the feeding and gives alarm. If the controller gives alarm, the error is corrected, and the controller is reset and re-started, and then the controller continues the feeding sequence, from where it was stopped.

The automatic release model 2.000 N can normally operate up to 100 volume dispensers, mounted in the release system with return drive. If you need to release more volume dispensers, more releases are parallel-coupled.

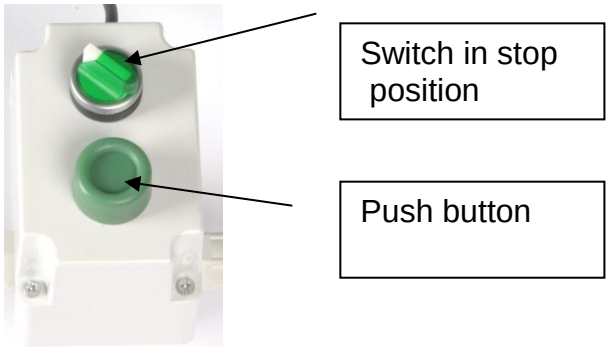
The control box contains an overload protection for protecting the actuator against overload. It might be necessary to adjust the potentiometer in the overload protection, if the actuator does not give satisfactory power.
The adjustment is done when the release is in outlet position, by screwing up the potentiometer, until the actuator starts to buzz, and then the potentiometer is turned a little backwards, until the overload protection is re-coupled, and the actuator stops to buzz.

6.6.5 Automatic Release Model 2007 and after

In systems with automatic release a feed sequence starts with filled volume dispensers being emptied into the through of the animals via the release. When the volume dispensers are again closed, the feed plant starts to fill up the volume dispensers for the next feeding.

It is also possible to release the feed manually via the release controller.

In an ordinary operating situation the release slowly opens the volume dispensers in order to reduce the risk of bridge building in the hopper. The dispensers are kept open during 10 seconds before they are closed again, and the plant starts filling up again to make the dispensers ready for the next feeding. On the control for section-wise feed release this situation is indicated by reversing switch in vertical position and control lamp lightening.



The release can be operated manually via the push button - to function in open or closed position - e.g. for control of the release system. The manual operation can also be used if it is wanted to release the feed before the set feeding time to have more time for adjusting the volume dispensers before filling them again.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

The manual sequence of programs is so that pushing once the push button makes the actuator going forward to the end stop. Here it waits 10 seconds before reversing and going back. If the button is maintained in pushed position until the actuator is at the end, the actuator remains here. One single push on the button makes the actuator return to its starting position again.

If disconnecting of sections is needed, e.g. because they are empty, this is made by turning the switch until the control lamp is turned off. So the actuator in question is disconnected from the automatic feeding cycle, but can still be operated manually with the push button. The position of the actuator is constantly surveyed by the MultiPork control, so that it is not possible to fill volume dispensers with feed if they are in open position.

6.7 Remote operation

The volume dispenser can be remote operated via a rod so that the quantity regulation can be done while walking behind the animals (see Fig. 51).

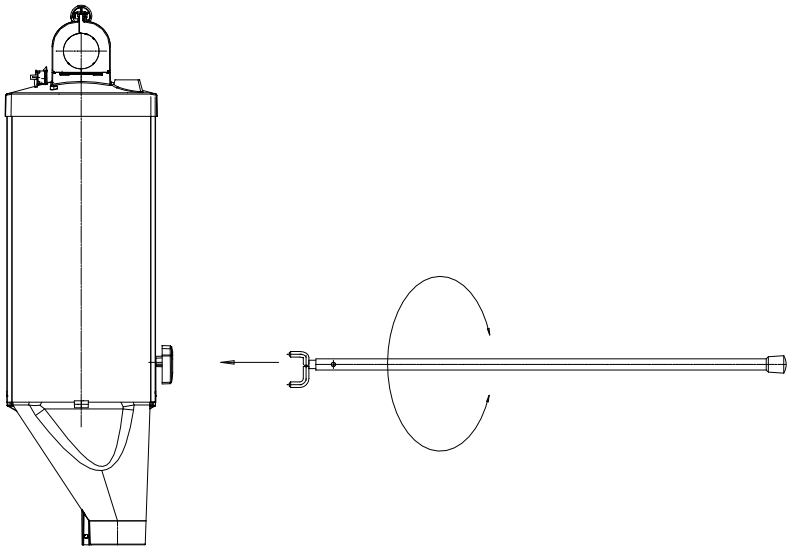


Fig. 51 Remote operation

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.8 Disconnecting of feed release

If a feed portion should not be released from a volume dispenser, it is possible to disconnect same by pulling the lock out of the release arm, and then turning the arm down into the release protection (Fig. 52). When the volume dispenser should be re-connected, press the release protection above the arm, so that it is disengaged and the lock can be re-pressed into the release arm.

Alternatively, set the bottomflap lock to closed position, so that the bottomflap stays up

Fig. 52 Disconnecting from releaser system

6.9 Safety system of the Transpork drive unit

The drive unit is always equipped with at least two safety systems. A breaking part is mounted between the disc arm of the gear shaft and the nave of the wheel. The breaking part is dimensioned in such a way that the system is not damaged if e.g. a foreign body is getting into the system. The breaking part also protects the system if the system is otherwise overloaded - e.g. at too much filling.

The other safety system of the drive unit is placed on the yellow indicator (Fig. 53). At one end of the indicator are placed two pins, moving together with the tension wheel. Between the two pins is placed an end stop switch (Fig. 53), which switches off the drive unit, if the system is too slack or too tight.

If the system is long, the tension unit will slide much at start of the system. Thus it might be necessary to increase the distance between the indicator pins by adjusting one pin in the oblong track.

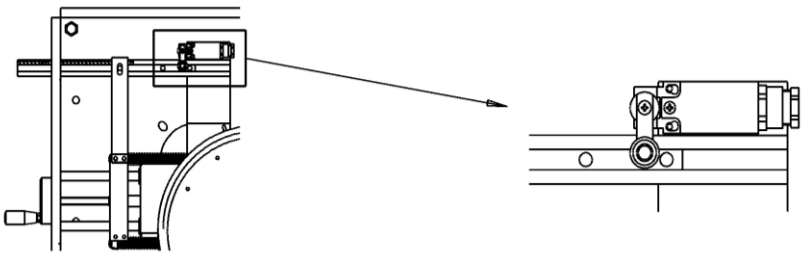


Fig. 53 Safety system at indicator

If a motor driven filling of the system is used, it is recommended to mount a **revolution guard** in the drive unit. This revolution guard is delivered with fittings for being mounted to the nave bolt of the tension wheel.
The revolution guard detects on the screws next to the path of the wheel so that the number of revolution is constantly checked. The revolution guard switches off the entire system if e.g. a foreign body gets into the system, and the breaking part bursts, so that you avoid that the filling continues after blocking of the system.

NOTE!! Cannot be used for TP0, TP0 M and MultiPork controls

6.10 MiniPork Drive Unit

The drive unit is always equipped with two safety systems. A breaking part is mounted between the disc arm of the gear shaft and the nave of the wheel (pos. 3, fig. 53A). The breaking part is dimensioned in such a way that the system is not damaged if e.g. a foreign body is getting into the system. The breaking part also protects the system if the system is otherwise overloaded - e.g. at too much filling.

The other safety system of the drive unit is placed on the threaded rod. A sleeve (pos.1, fig 53A) is screwed onto the threaded rod, and this sleeve must always be positioned opposite to the micro switch (pos. 2, fig. 53A). If the spring tension is too low or indeed too high, the sleeve will move away from the switch, and cause the system to stop.

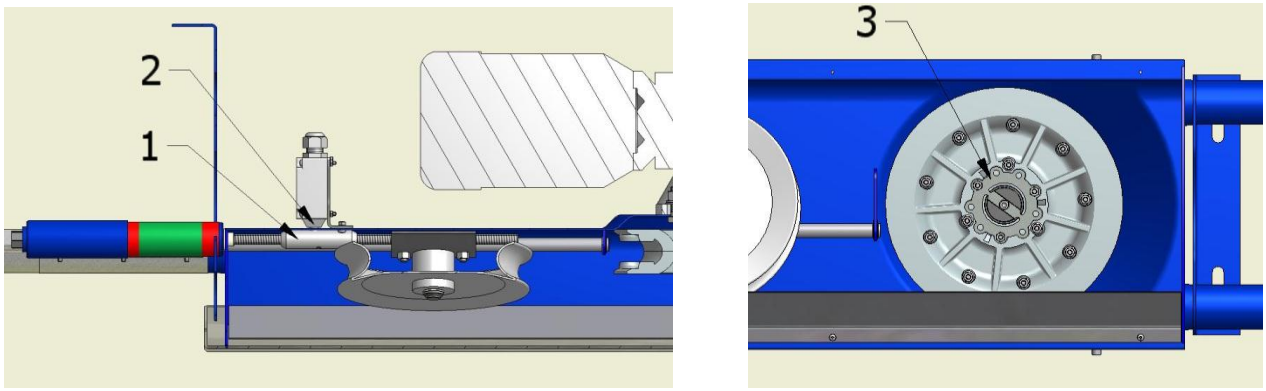


Fig. 53a: MiniPork safety system

6.11 Replacement of breaking part

A breaking part is mounted between the driving wheel and the gear shaft. The breaking part will protect the system against overload, if e.g. a foreign body gets into the system. If the breaking part bursts, the faults must be located and repaired, before the two plate pieces are dismantled and a new ORIGINAL breaking part is mounted. Not original or self-made breaking parts can under no circumstances be mounted, as such would not protect the system in the correct way against overload.

Remember that the arm on the hub has to pull at the breaking part.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.12 Locating foreign body in the system

If a foreign body is in the system, it is mostly sitting in the hopper or at one of the first corners. NB: Note that the inspection windows of the hopper cannot be opened without disconnecting the main switch of the system.

If it is difficult to locate the foreign body, the drive unit can be turned manually, after dismantling the breaking part so that the system is tightened. Once the system is tight, it is blocked so that it is tight on the pull side. Then the tension wheel is screwed all the way forward, and the system may be taken off the tension wheel so that the system is perfectly slack on the exit side. Now the foreign body can be located by checking at various spots in the system whether the system is slack or tight. Removing the lids from the corners makes access to the wire.

6.13 Opening for medicine

If medicine should be added to the feed, it is possible to take out a plug at the top of the volume dispenser so that medicine can be added into the feed in order that it is mixed during feeding. It is marked on Fig. 54 where the plug can be taken out. Afterwards a plastic plug that can be ordered from your TransPork dealer can close the hole.

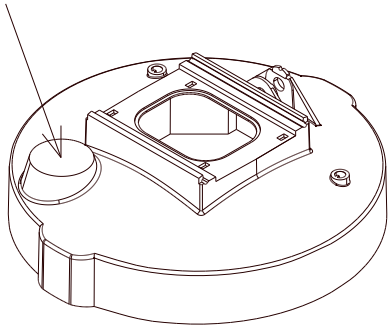


Fig. 54 Opening for medicine

6.14 Cleaning/Inside inspection of the volume dispenser

The easiest way to clean the volume dispenser is to wash with water - possibly cautiously with a high pressure cleaner - where it is recommended to turn down the water pressure to avoid damage to the volume dispenser.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

6.15 Trouble-shooting

Breaking part is burst:

- Foreign body in the system (see the section: “Locating Foreign Body in the System”).
- Too heavy filling. Adjust the hopper.
- Joint link mounted incorrectly. Check by means of assembly template.
- Critical dimension of granulates which stick between pipe and discs. The granulate diameter cannot exceed 5 mm, and the length must be under 10 mm. The system is not recommended for beet pellets and other hard pellets.

Corner makes noise:

- Corner housing mounted so that it has become jammed. Adjust.
- Foreign body in the corner wheel. Clean the corner.
- Worn out corner wheels. Replace the wheels.
- Corner wheel mounted with wrong revolution direction. Turn the wheel.

The system does not start:

- Wrong system tension so that switch in drive unit disconnects. Adjust system tension.
- Motor protection cuts off. Find reason and reset.
- Safety switch not connected after disconnection. Connect and re-start.
- Fuse blown. Find reason and re-start after replacement of fuse.
- Fault on revolution guard in drive unit. Reset and re-start once the reason is found.

No feed in the system:

- Silo empty. Fill the silo or go to alternative silo.
- Hopper blocked or incorrectly adjusted. Clean and adjust.
- Check function of motor driven hopper, if any.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

7. Trickle feeding

7.1 Field of application

Transpork trickle feeding is designed for new installation of Transpork feeding systems with volume dispensers or for later installation on existing volume dispensers with an outlet designed for ø 75 mm pipes.

The system is primarily used for feeding of untethered sows, gilts and porkers in flock, in order to ensure that all animals get the required feed quantity.

However, the system can be used in other pig sections where a restrictive feeding in animal flocks is required.

The system is meant for feeding of meal and pellet with a max. diameter of 5 mm and a max. length of 10 mm.

One proportioning unit is meant for feeding of one or two animals.

A proportioning unit consists of a volume dispenser (1), a cellular dispenser (2), two flex hoses for connection to cellular dispensers and down pipes (3), two down pipes ø50.8mm (4) and two assembly sleeves (5).

The various proportioning units are connected by means of a driving shaft (6), protected by a pipe. Apart from that at least one gear motor (7) should be used as a minimum at every 20 cellular dispensers (see Fig. 55).

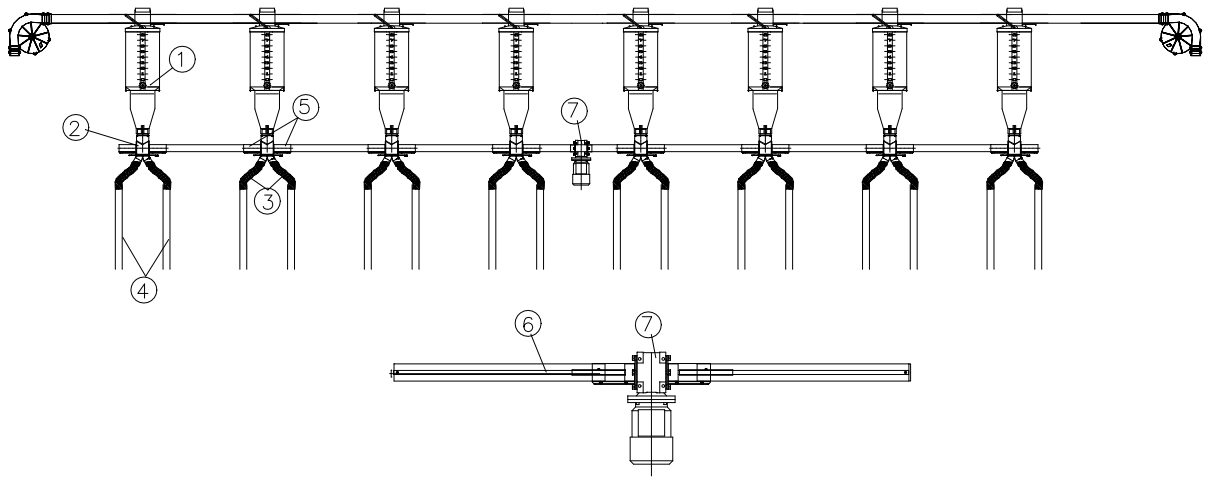


Fig. 55 Construction of trickle feeding

The volume dispensers are filled by a dry feeding system. During feeding the gear motors operate with a pulse-pause time that can be regulated depending on the quantity of feed to be fed per minute.

The system can feed from 0.05 to 2.8 litres per eating spot per minute.

The cellular dispenser will proportion feed to one or two animals in an even speed which keeps the animal at the eating spot, until all feed is fed, thus avoiding fights during feeding. The feeding time can be adjusted to the time it takes to feed the animals that shall have the most feed.

Trickle feeding is controlled from a controller in which can be adjusted the necessary feeding speed by means of a timer system where you adjust the pulse and pause time necessary for achieving the required feeding speed and the necessary feeding time in order to be able to empty all volume dispensers.

The basic unit comprises a controller with timers and two motor guards for the gear motor.

Apart from that you can connect a random number of extra boxes for motor guards each with the possibility of up to 6 gear motors. Use a gear motor at every 20 cellular dispensers.

The system can be started manually or with start from a 24-hour clock. It is possible to start the filling systems after finished feeding.

There can also be connected a magnet valve for water so that the animals can get water in the manger during feeding.

7.2 Installation of trickle feeding special parts

7.2.1 Installation of gear motor drive

If possible the gear motor must be placed in the middle of the number of cellular dispensers for which the drive is meant. The single gear motor is meant for up to 20 cellular dispensers.

The gear motor ought to be mounted on a wall with a wall garniture or on a cleaning wall/ pen partition with wall garniture/mounting iron. It is important that the gear motor is mounted in a solid way. However, the final placing cannot be made, until the drive shaft is mounted. Mount shaft connector and pipe sleeve on the gear motor drive shaft.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

7.2.2 Installation of cellular dispensers

Install the cellular dispenser in the outlet hopper by pushing it up into the hopper and fastening it by screw (pos. 7, Fig. 56).

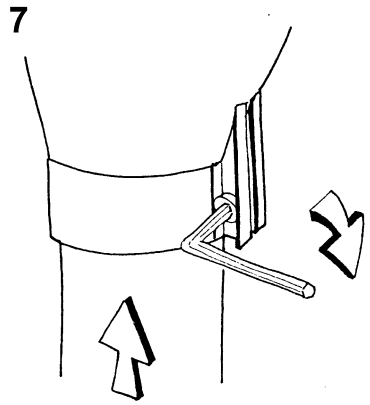


Fig. 56 Installation of cellular dispenser

Now connect the various cellular dispensers to the gear motor drive by means of the drive shaft, which is drawn through X number of cellular dispensers, depending on the distance between them. One end is led to the spot where the gear motor is to be mounted. Then adjust the gear motor in height and length.
During mounting of shaft for cellular dispensers, the protection pipe ø50.8mm and the sleeves between the various dispensers must be shortened and mounted. An easier mounting is achieved by pointing the square shaft a little. The mounting should start from the gear motor and to the sides.

In order to facilitate a possible service, it is important that the distance on the protection pipe is equal to the distance between the two dispensers minus 100 mm. This distance will be covered by assembly sleeves and will at the same time permit the opening to the joints of the drive shafts.

The opening on the assembly sleeves must point downwards so that possible dust and moisture can get out (Fig. 57).

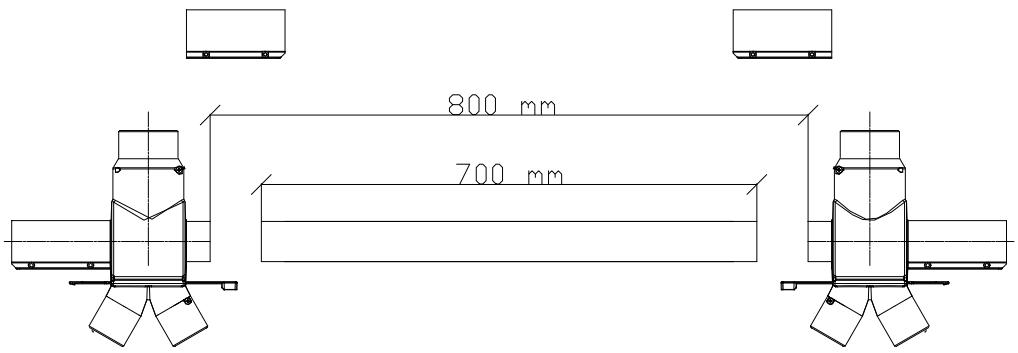


Fig. 57 Shortening of protection pipe

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

In order to facilitate assembly of the drive shafts, one of the ends at the assembly of two shafts ought to be shortened 8-10 cm from a cellular dispenser. The drive shafts can profitably be chamfered at the ends (Fig. 58).

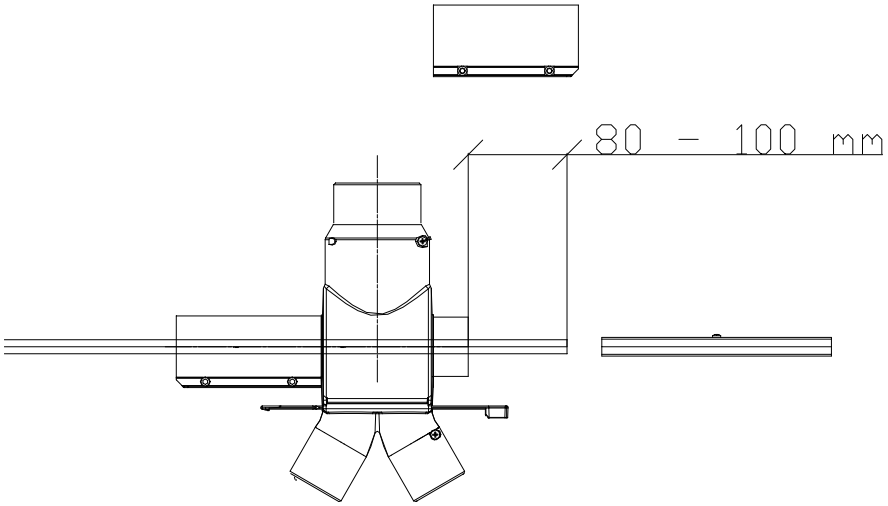


Fig. 58 Shortening of drive shaft

NB: In order to facilitate service, it can be recommended to mark up the joints.

During installation of cellular dispensers it is important that the various dispensers are supported correctly, by supporting the protection pipe for drive shaft. There must be a support at every third dispenser at distances under 75 cm - and at every second dispenser at distances over 75 cm.

This support can either be undertaken with wall armature on wall or with wall armature / mounting iron on cleaning wall/pen partition. Suspension iron can also be used for trickle feeding, where other things are not possible, or double U-iron at stanchion for feed pipe (see Fig. 59).

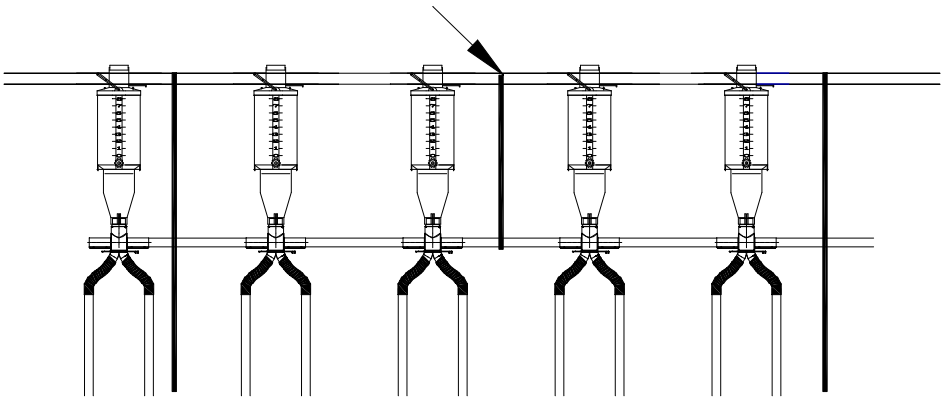


Fig. 59 Suspension of protection pipe

At the end that shall be connected to the next drive shaft, the entire unit is rocked into position, and then the assembly sleeve for drive shaft is pushed into position, and the

protection pipe is closed with the assembly sleeves. Do not forget to mount the screw on the joint for drive shaft. If not, it might be displaced during feeding, resulting in no connection (Fig. 60).

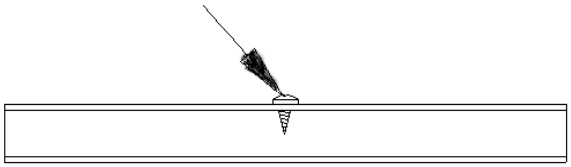


Fig. 60 Screw for assembly sleeve

At termination of gear drive, use a bushing at both ends of the shaft. The shaft itself must be positioned in the bushing (Fig. 61) in order to reduce the wear on the cellular dispenser as much as possible. Fix the end bushing to a machine or a wall.

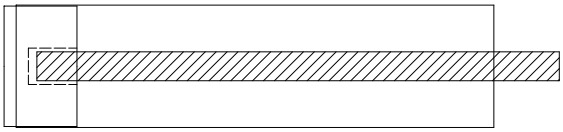


Fig. 61 Bushing for shaft end

7.2.3 Installation of down pipe

Install the various down pipes Ø50.8 mm in the individual feeding stall. They can profitably be cut in an angle of 45° at the bottom in order to reduce the risk of piling up. Install the down pipes either with double U-iron in the front of the eating stall, or with wall armature on wall/equipment.

Once the down pipe is installed, connect it to the cellular dispenser by means of the supplied plastic hose that ought to be mounted on the cellular dispenser first. It might be necessary to lubricate the hose with oil before installation for enabling this. The hose must be as short as possible, in order to avoid that the inclination gets too small to obtain safe feeding (at least a 60° inclination) (see Fig. 62).

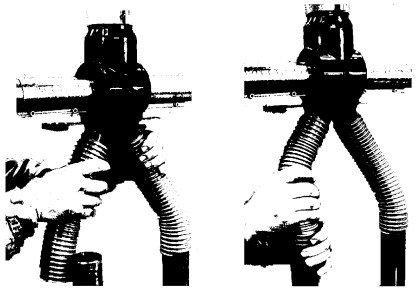


Fig. 62 Installation of hose for down pipe

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

7.3 Operation

The cellular dispenser is as standard meant for proportioning to two eating stalls. If only one side shall be used - either because of an uneven number of eating stalls in a pen, or because a pig has to be removed from the pen - push the closing throttle for the cellular dispenser to one side (Fig. 68) where it is automatically kept in place by the small spring locks. **REMEMBER** to set the dispenser on half feed quantity in relation to the rest.

If a dispenser shall not be used, close the throttle on the volume dispenser (Fig. 63), meaning no feed in the dispenser.

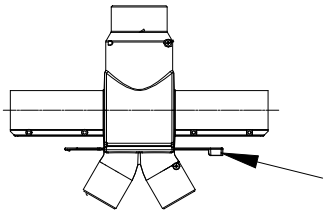


Fig. 63 Throttle for cellular dispenser

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

7.4 Trouble shooting

Found fault, cause and remedy

Cellular wheel does not proportion or only to one side

Closing throttle is entirely or partly closed. Set throttle in correct position.
Cellular wheel is blocked. Dismount cellular wheel and clean.
The feed sticks to the volume dispenser. Clean the volume dispenser.
Rubber flaps in cellular dispenser defective. Replace.

A few or more gear motors do not operate

Motor protection not disconnected. Check that all systems are correctly mounted, and possible breakages on the systems.

Material falls out

Replace flaps.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8. Phase feeding

8.1 Field of application

With Transpork phase feeding system you can feed up to three mixtures in the same pipeline. The system consists of the same components as an ordinary feeding system. However each feed outlet can be adjusted to feed the required type of feed, and below the silos motor hoppers/flex augers are installed.

When feeding is initiated, the component exchanger is set to position 1. Then all feed outlets are opened where feed type 1 is to be fed. Then the drive unit and the motor hopper under silo 1 start. The feeding continues until the stop sensor on the pipeline is activated and via the preset empty running time, the pipeline is emptied. When empty running time has ended, the component exchanger goes to the position of the next active feed type, and the feeding cycle starts again with the next feed type. See description of operation and feed cycle in manual for phase feeding control.

8.2 Feed pipe

When mounting feed outlets it must be secured that the phase feeding throttle has enough room for moving, meaning distance to the corners and pipe hangers (Fig. 64). You can possibly mount the feed pipes under the pipe hangers instead of on top (Fig. 65). However, there will still be systems where this is impossible (a.o. certain pipe feeding automats). Here you can use a U-clamp No. 137000020 on top of the armature of the feeder (Fig. 66). A clamp is installed and fixed on each side of the feed outlet in order to prevent the feed outlet from moving during change of component.

Remember to tack on label before installing the clamp.

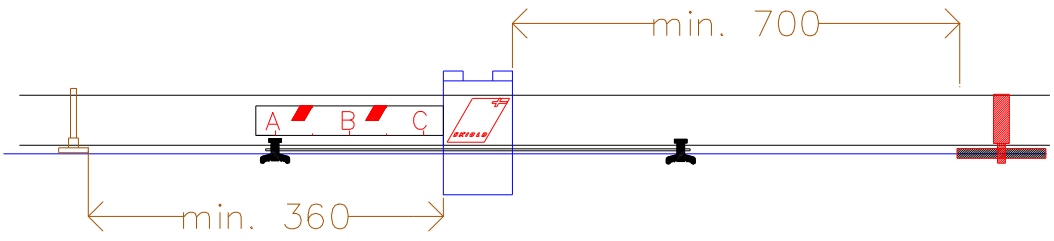


Fig. 64 Installation of phase feeding throttle – distance from corner and pipe hangers

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

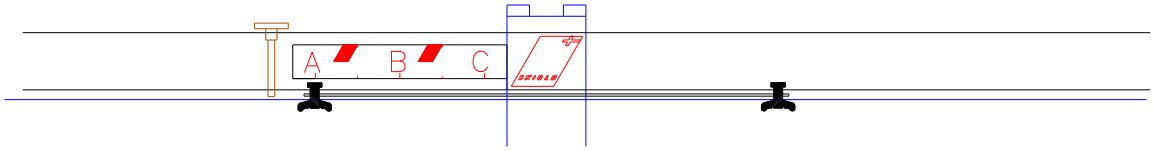


Fig. 65 Installation of phase feeding throttle – feed pipe below pipe hangers

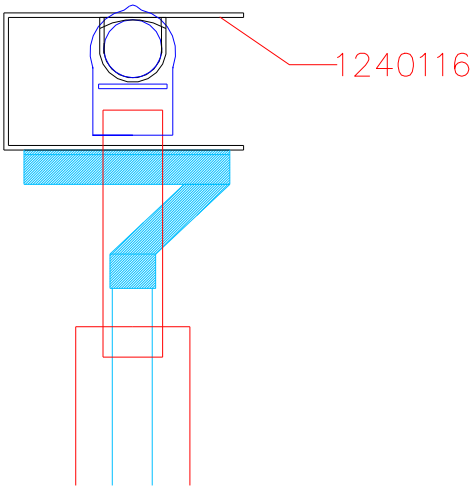


Fig. 66 Installation of phase feeding throttle – U-clamp and feeder armature.

Because of emptying of the feed line, the holes for feed outlets should be drilled min. Ø38 in order to ensure an efficient outlet, as theoretically almost all outlets can be the last outlets for the individual mixture. At a long pipeline no problems should occur at the first outlets.

8.3 Change of feed

The system for change between the various feed mixtures must be designed as a round pull drive controlled by a component exchanger (Fig. 67).

The component exchanger is mounted either on the wall or on a feed pipe so that the drive on the system is equal in proportion to the feed throttles.

The feed pipes must be supported so that they do not move when the component exchanger is working.

The component exchanger is coupled directly to the feed computer, from where it can also be operated manually.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

The number of feeding spots per component exchanger depends on the design of the system drive. The component exchanger has a tractive effort of 2000 N, which is sufficient for closing 40 feed outlets. At bigger systems more component exchangers are mounted.

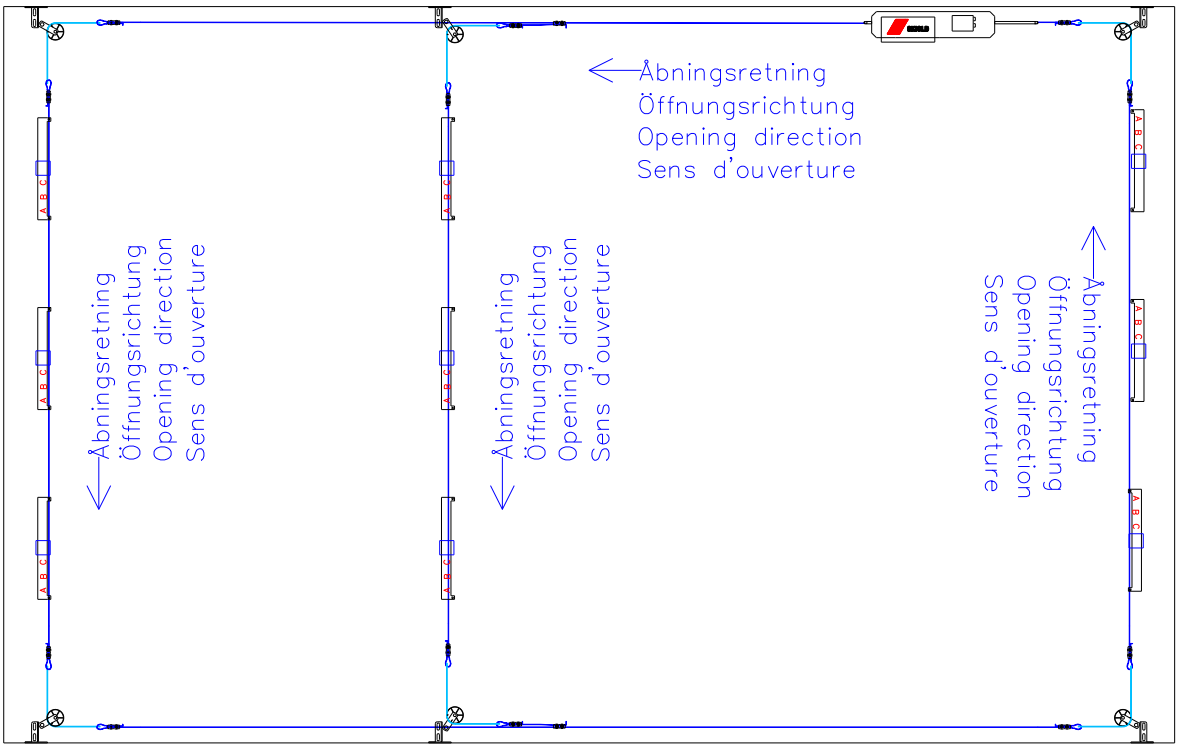


Fig. 67 Draft of housing layout

8.4 Adjustment for component exchanger

During start-up it might be necessary to re-adjust the switches for pos. A and pos. C on the component exchanger (Fig. 68). Usually it appears by the feeding computer not getting a feedback that it has changed.

At adjustment the switches are moved 1 mm at a time.
At missing feedback from C, they are moved towards the motor, and at missing feedback from A, they are moved at the opposite direction.
This procedure should only take place during start-up of the system.

If the control switches are not activated within the programmed time, the controller gives alarm. The error must be remedied before the system is re-started.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

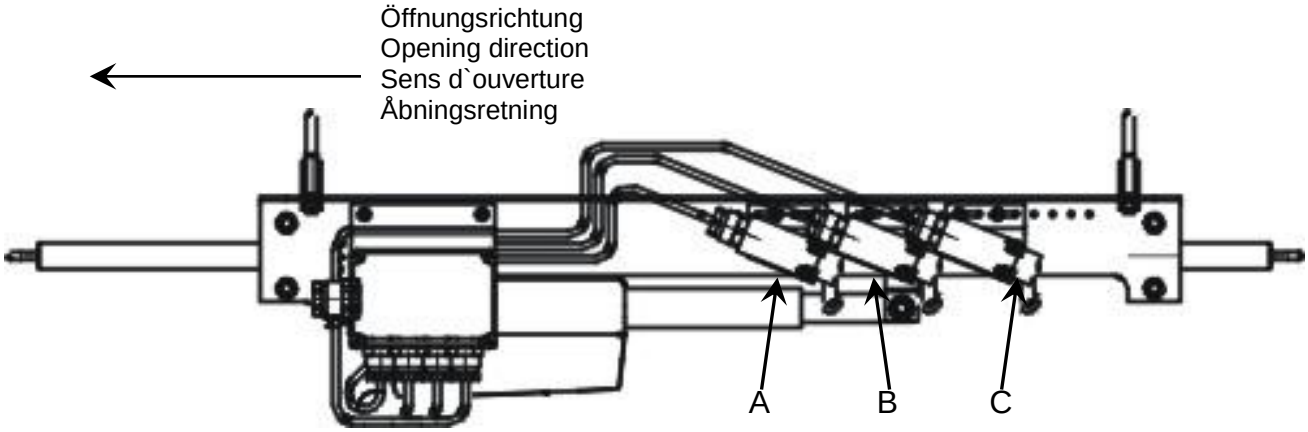


Fig. 68 Component exchanger

Fig.69 Shows the connection-diagram for Control switches

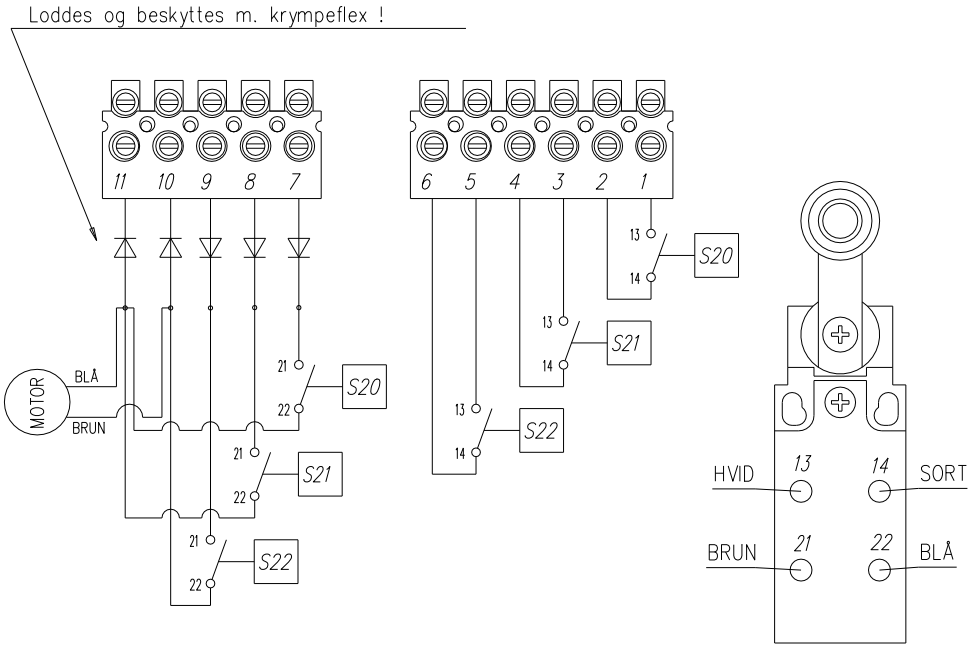


Fig. 69 Circuit diagram for control switches

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.5 Round pull drive

When mounting the round pull drive it must be noted that the phase feeding throttle must move to the left, seen from the side with the wing nuts, when the system changes from neutral (mixture A) to mixture B or C, because of label for adjustment of throttle. The piano wire should be mounted so that it is on the opposite side of the phase feeding throttle in proportion to the wing nut (see Fig. 70).

At the volume dispensers the piano wire for the phase feeding throttle must be placed at the opposite side of the release arm in order not to collide with this (Fig. 71). Also the wing nut shall turn upwards here, where with advantage you can mount it downwards at ordinary phase feeding outlets.

NB: Do not forget to place a lock nut on the bolt so that the wing nut does not fall off during cleaning.

The steel pipes MUST be degreased before the label is added.

Re-adjustment between the various feed mixtures takes place when the component exchanger is in neutral position, where the phase feeding throttle is then placed so that the wing nut is standing at the required feed mixture.

The system must be constructed in such a way that the drive on the phase feeding throttles has the same degree in order to reduce the necessary tractive effort.

At phase feeding the system rollers must always be installed on wall in order to ensure stability at the round pull drive.

The system must be designed with piano wire on all straight distances - meaning that there should only be used system at the system rollers in order to reduce the necessary re-adjustment. Do not forget turnbuckles on EACH row (Fig. 72).

At mounting at corner wheels and through walls there shall be at least 200 mm from corner/wall to wire lock in order for the system to be able to move.

Further directives for erection of release system; see directives for releaser system for volume dispensers.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

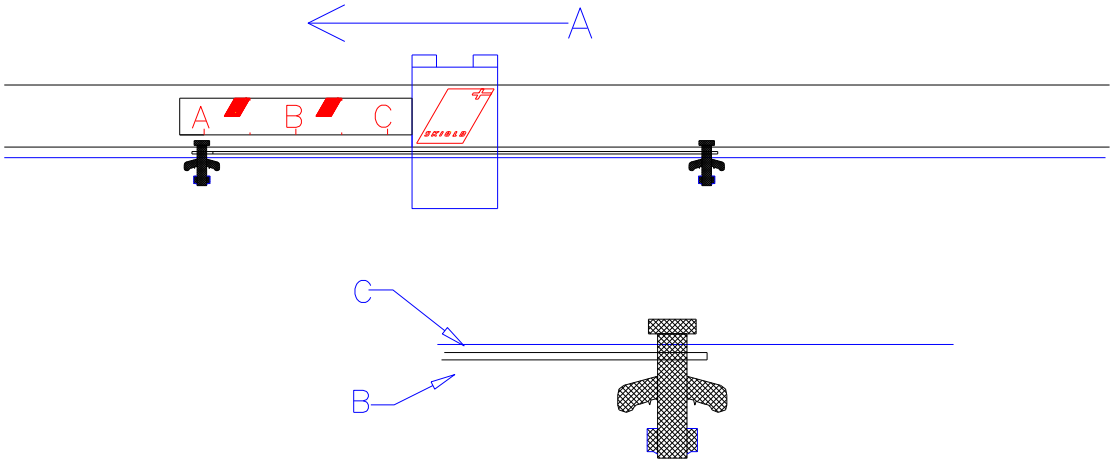


Fig. 70 *A: Opening direction for wire system*
B: Phase feeding throttle
C: Piano wire

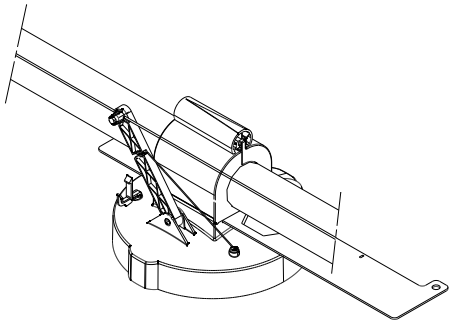


Fig. 71 *Installation of phase feeding throttle/piano wire*

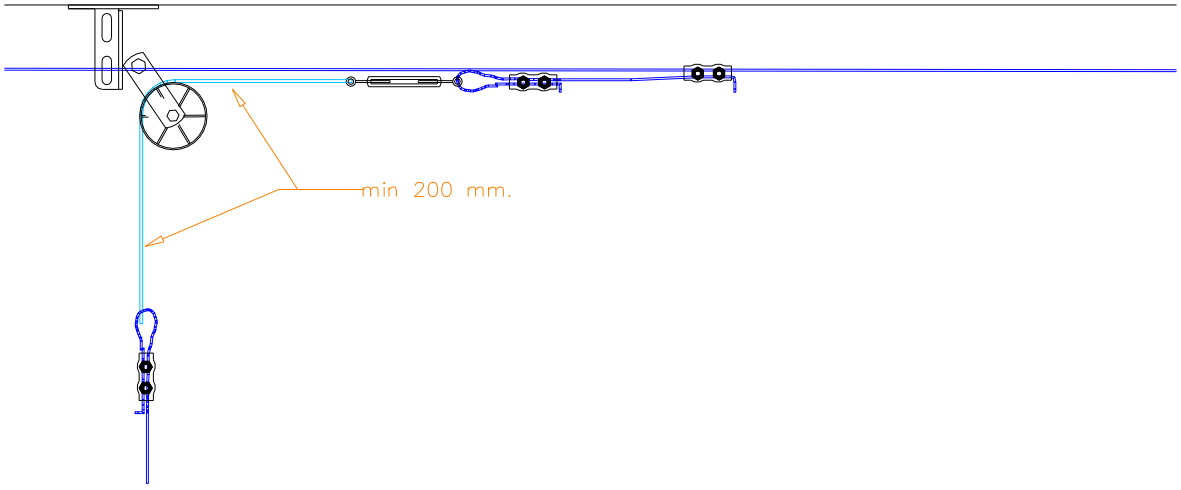
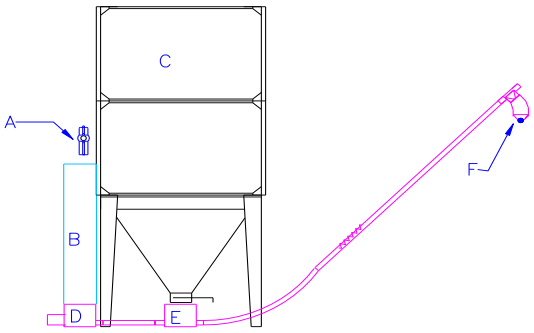


Fig. 72 Installation of turnbuckle

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.6 Residue silo

For the remaining feed in the feed pipes after finished feeding sequence the system can be equipped with residue silo. This can either be mounted with its own flexible auger for emptying or it can be mounted together with the silo as first inlet on the flexible auger of the silo, where is used a flexible auger for filling of the feed system (Fig. 73).



A: Return valvel
B: Residue silo
C: Silo
D: End inlet flex auger
E: Intermediary inlet flexible auger
F: Inlet for feed line

Fig. 73 Draft over residue silo

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.7 SKIOLD return valves

The valve is always placed above the residue silo. At outdoor mounting the connection to the residue silo must be tightened with silicone, and you can with advantage use rain cover for the valve.

The feed pipe must be shortened to fit to the valve, after which it is mounted with the joint. After ended mounting the valve must be suspended correctly with minimum one fitting per valve.

It is possible to mount switches for indication of actual position (Fig. 74).

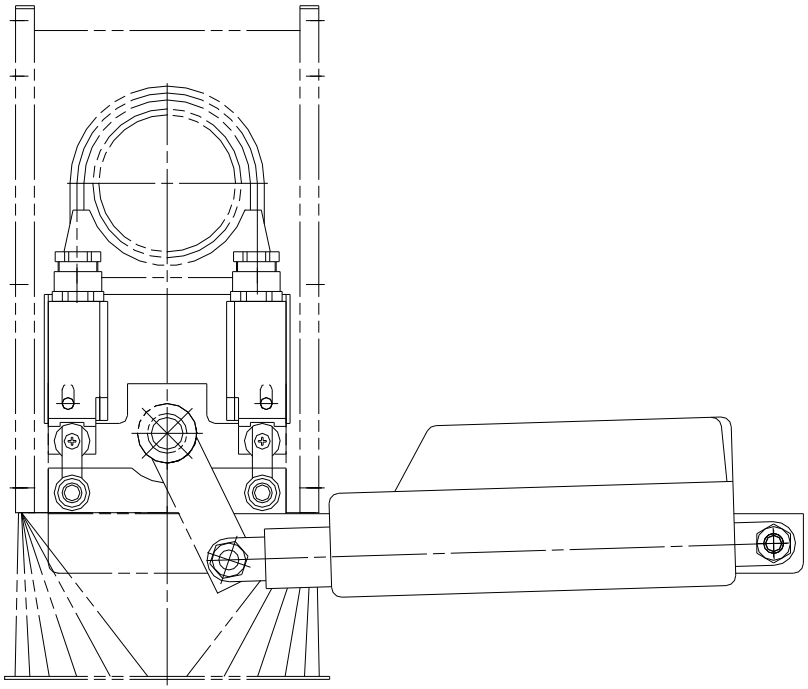


Fig. 74 Draft of SKIOLD valve

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.8 Feeding valve with feedback signal

8.8.1 General Technical Data

The electric valve is available in 2 versions for tube diameter Ø50,8mm and Ø63,5mm. Power supply is 24VDC. Both versions have the same mechanical construction. The control print is delivered with Feedback signal at activity of the valve. The drive motor is equipped with a multi-fuse.

Electrical valve with feedback (7-wire)

Feeding power		***Control***	
U	=	24VDC	
U	=	24VDC	
$\mathbf{I_{unl.}}$	=	100mA	(Unloaded)
I	=	15mA	
$\mathbf{I_{block}}$	=	800mA	(Motor blocked)
$\mathbf{I_0}$	=	5mA	(Motor standing still, valve closed, Led is red)
$\mathbf{I_0}$	=	14mA	(Motor standing still, valve open, Led is gren)
t	=	3sec	(Reactiontime open/closed position)

In order to operate the valve in the open position, the valve has to be supplied with control power during the entire open-position period.

Connection Data:

Description	***Colour***	***Function***
Feeding power	Green	GND
	Brown	24 VDC
Feedback signal	Blue	C-contact
	Grey	NC
	Pink	NO
Control	Yellow	ND
	White	24 VDC

8.8.2 User instructions and Maintenance

Please Note:

Always disconnect the power before maintenance or repairs. Never Place hands or fingers inside the valve nor disassemble the valve before the power is disconnected

During the first days of using the valve, check on a regular basis if the electric valve turns well. Also check regularly if the tubes of the transport system are still horizontal.

The electric valve is when used normally, maintenance free.

Please note:Never clean the valve with water under high pressure. Also never spray water in the opening of the valve

8.8.3 Reset the Multi-fuse

To protect the drive motor, a multi-fuse is placed in the switch. If the charging rate of the motor is too high (probably caused by blocking of the rotating bush), the fuse will activate. To reset the multi-fuse, the power has to be switched off. Then the cause of the blocking has to be removed and the power can be switched on. The valve is now in working order again. (Check the working of the valve)

8.8.4 Troubleshooting

Problem	***Possible cause***
1.The electric valve does not function	• No power • The switch is not activated • There is no signal from the computer • The motor is blocked • The multi-fuse is activated
2.The electric valve turns with great difficulty and slowly	• The power supply is too low • The axial tension on the valve is too high • Feed has accumulated • Conveyor pipes are not horizontal

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.8.5 Guidance for mounting the valve

Please note:

- Never assemble the electric valve against or on a wall
- Always assemble the electric valve on a horizontal part of the conveyor pipes. Use if necessary a flexible pipe between the valve and the outlet pipe, so that the outlet pipe can be mounted at an angle
- The pipe has to enter and leave the valve in a straight line.
- It is important that the axial pressure on the valve is as low as possible.
- Make sure that the conveyor pipes and the valves are hung correctly; this means that they have to hang completely free and in a straight line.(Fig.75)

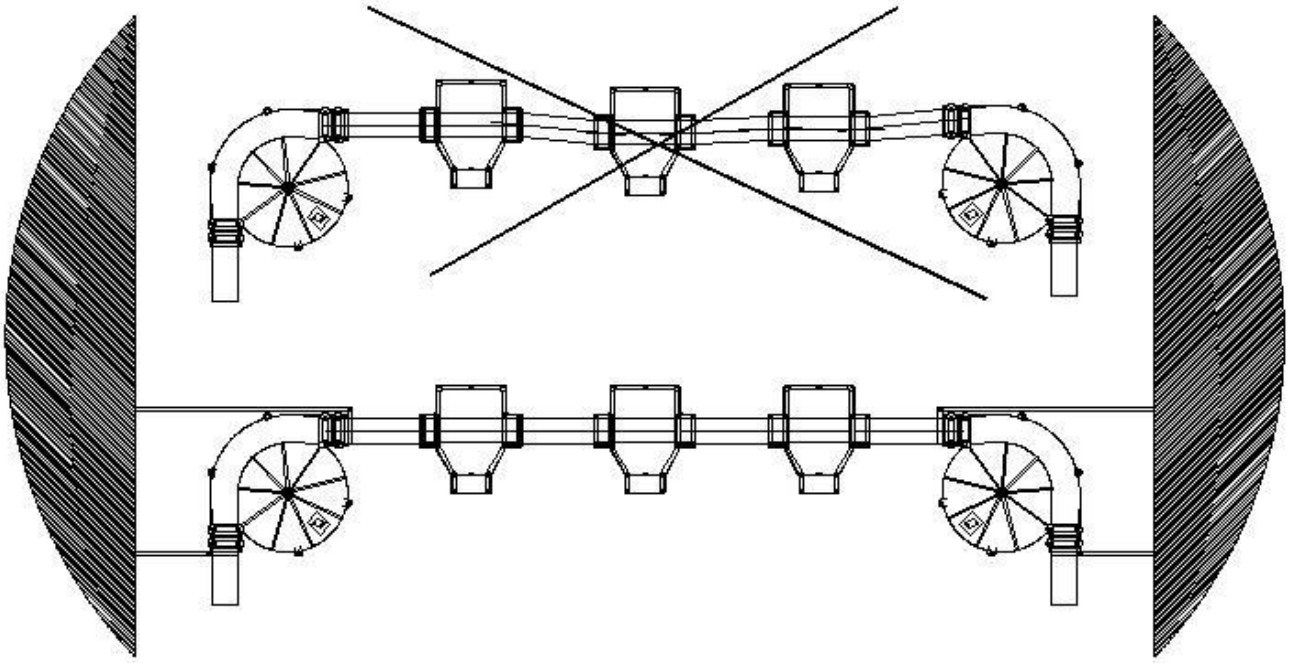


Fig. 75 Mounting of Feedvalves

- Use as much as possible 1” pipe with T-Clamps 1” x tube diameter for supporting the pipes. Where this is not possible, a chain can be used hanging from the ceiling. If two or more valves are hung close to one another, a support or chain has to be placed between the valves.(Fig.76)

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

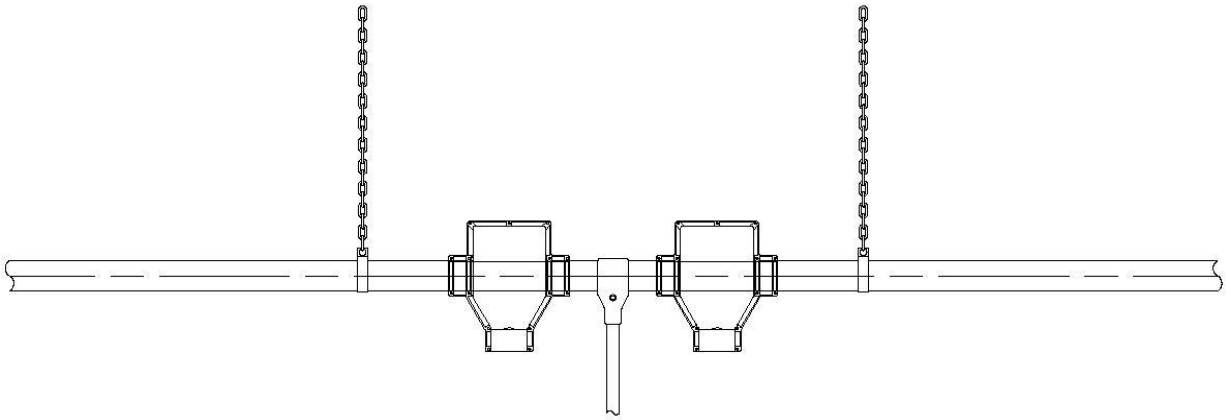
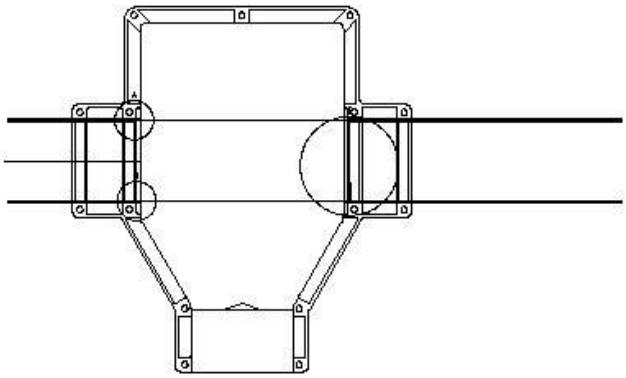


Fig. 76 Support of Multiple Feedvalves

- The conveyor pipes have to be sawed squarely and the burrs have to be removed, however do not round off.(Fig.77)

1.After sawing, with burrs
2.Burrs removed wrong
3.Not sawed squarely
4.Correct



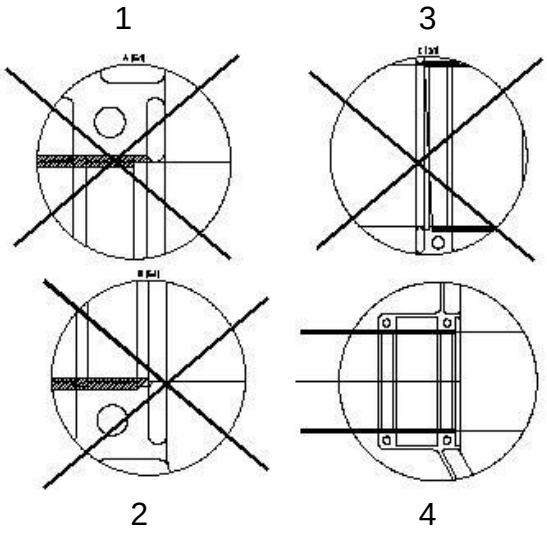
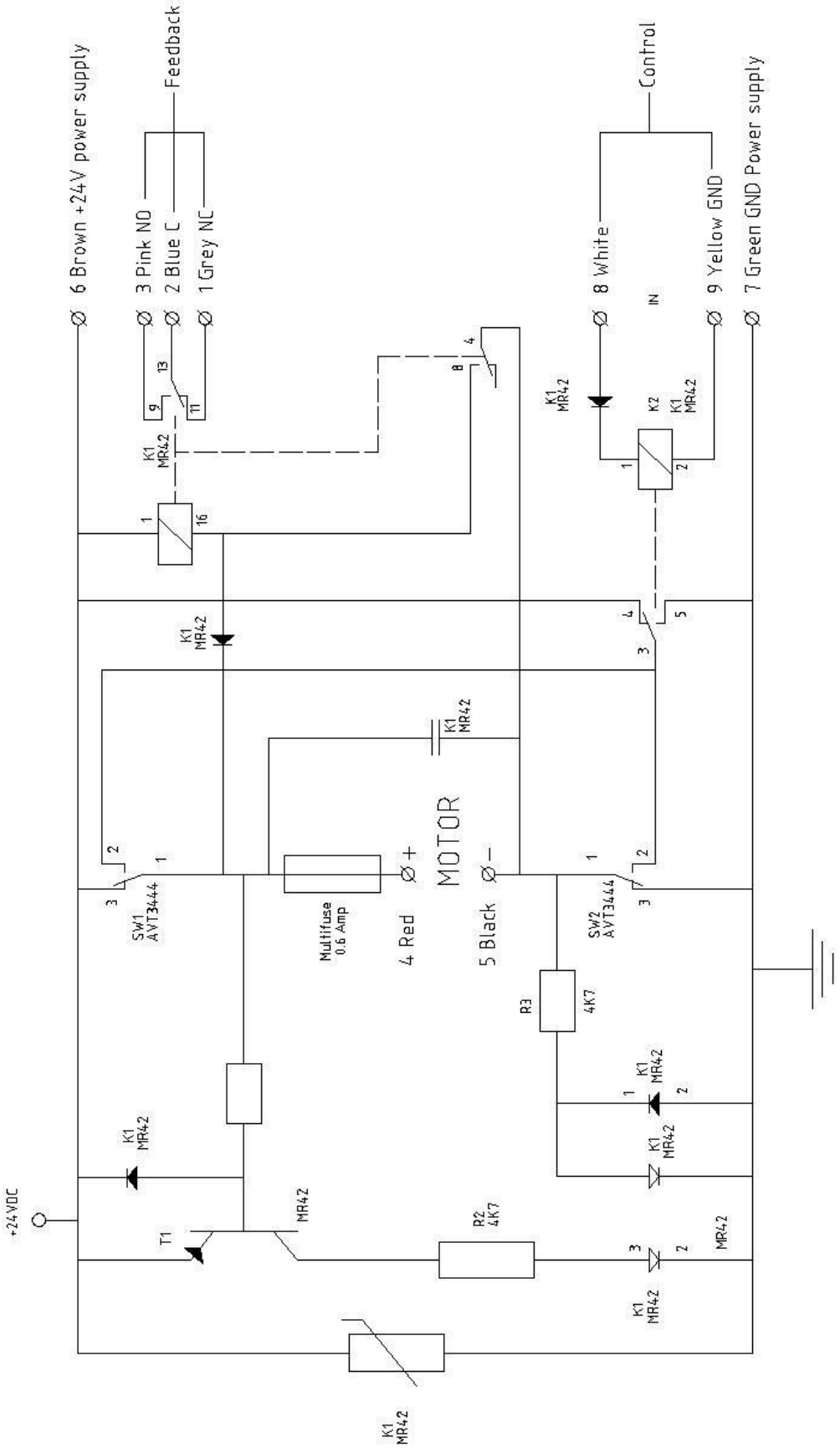


Fig. 77 Sawing of Conveyor-pipes

- Do not assemble the connection cable of the valve too tight
- Never connect the cable on the valve itself.
- Make sure that the connection boxes in the housing are waterproof

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.8.6 Connection diagram



SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

8.9 Mounting of middle inlet in connection with residue silo

The cover (Fig. 78) is used at proportioning of pelleted material. At proportioning of granulated material the cover must be removed, if the problem occurs that the material is stuck in the silo.

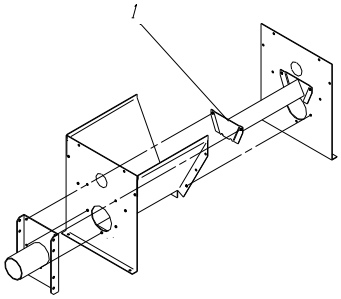


Fig. 78 Installation of intermediary inlet in connection with residue silo

Intermediary inlets are difficult to control from a capacity point of view and may cause overloading of the auger if following lines of direction are not followed carefully.

There may only be mounted one intermediary inlet on an auger.

The distance from the first inlet to the intermediary inlet may not exceed 3 m.

The total length of the auger may not exceed 20 m when an intermediary inlet is mounted.

The first inlet and the intermediary inlet shall be mounted in line so that the auger is totally straight to and including the intermediary inlet.

If the intermediary inlet is mounted under a bigger silo from where pellets are proportioned, the cover (pos. 1, Fig. 78) shall be mounted in order to reduce the pressure on the auger.

A pipe for inlet regulation shall be mounted in the intermediary inlet. This pipe shall at the same time prevent that the auger gets up into the inlet. The pipe shall be connected to the regulation pipe of the first inlet as follows (Fig. 79).

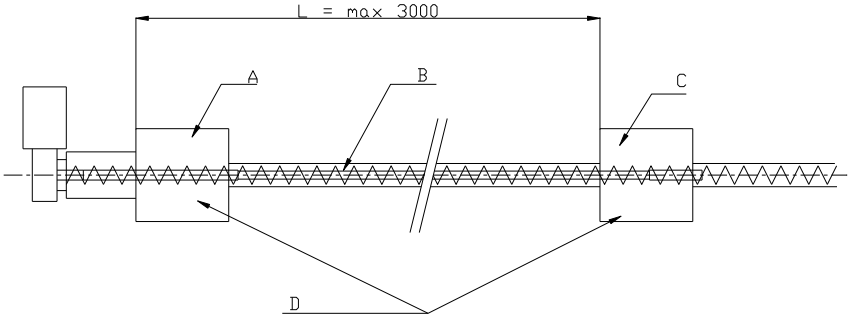


Fig. 79 Installation of regulation pipe

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

The length of the connection pipe shall be similar to the centre distance between the inlets.

The connection pipe is led 85 mm into the regulation pipes and fastened with perforation of 8 mm steel bolt and lock nut (Fig. 80).

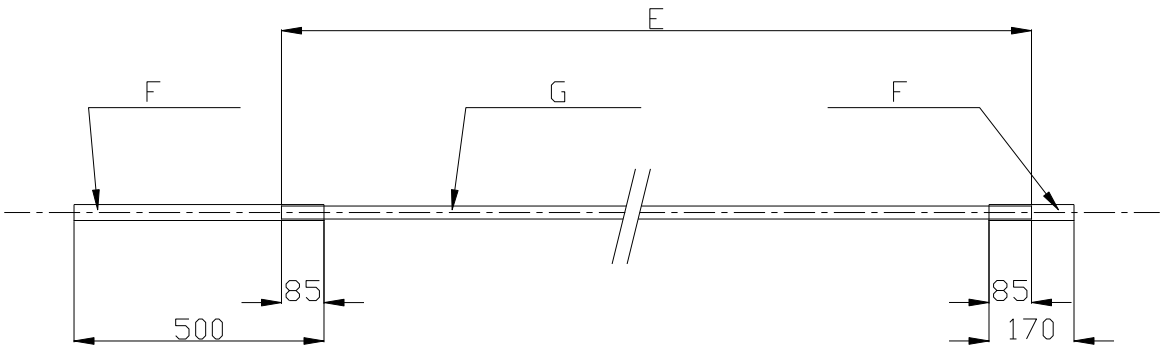


Fig. 80 Installation of connection pipe of the regulation pipe

For further information in connection with installation of flex augers please see manual for flex augers.

8.10 Connection from flex auger to Transpork

Feed inlets from flexible augers to feed systems can deliver into inlet from horizontal auger or from 45° inclination. Here a 30° Ø 150 bend must be used, as the feed will otherwise accumulate in the inlet (Fig. 81).

Fig. 81 Accessories for feed inlet from flex augers

Do not forget inspection pipe after last inlet.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

At phase feeding the silo “A” must always be first on the filling side. If not, problems might occur with over-filled pipe (Fig. 82).

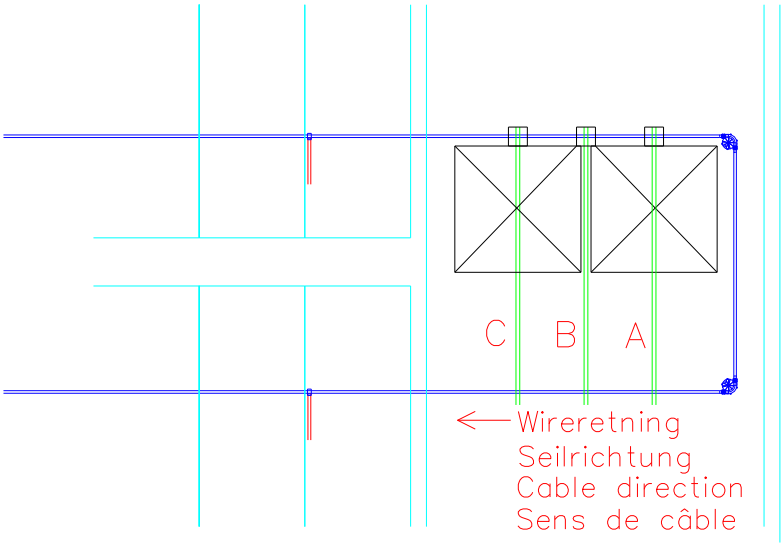


Fig. 82 Draft over placing of silo

8.11 Operation and trouble shooting

For further information regarding operation and fault finding in connection with phase feeding please see our manual for phase feeding control.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

9. Maintenance

9.1 Shortening of feeding-wire

When the system is put into operation, the feeding-wire will stretch. The stretch is biggest at the beginning, where it is necessary to keep an extra eye on the wire tension. The drive unit is also equipped with a stop switch, switching off the system, if the wire gets too slack.

When the feeding-wire has stretched so much that a shortening is necessary, normally several discs can be shortened off. The front plate is dismantled and the joint link is driven forward in the drive unit. **After that do remember to disconnect the current at the safety switch so that the system does not suddenly start.**

After the tension wheel is driven forward towards the driving wheel, dismount the joint link in both wire ends.

It is recommended to shorten a disc after and before a joint in turns (see Fig. 83) as it usually is around a joint a later break will occur.
The screws at the wire ends, that have to be shortened, are unscrewed and pulled out of the joint. A solid jerk is made at the first disc in order to prevent eventual tensions in the wire. One disc is removed. Use the assembly template to cut at the correct position (see section 5.12.1).
After shortening the wire and before lubricating the wire ends and mounting it in the joint link, check that the heart yarn has not withdrawn, in order to ensure that they are mounted into the joint link**.** See also section 5.12.1, where assembly of feeding-wire is further described. Remember to lubricate the wire ends with system oil, before remounting the joint link.

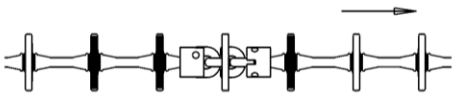


Fig. 83 Shortening of feeding-wire

The wire is placed in the drive wheel and the open corner wheel is remounted. The lid of the drive unit is installed and the spring on en eventual telescopic joint is tightened.

Check that the indicator is the green field.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

9.2 Inspection of wire tension

It is recommended constantly to keep an eye on the joint link in order to avoid a demolition of the feeding-wire. Re-tighten the pivot screws after **50-100 hours of operation,** and at the same time check the distance around the joint link.

After many operation hours it must be expected that fatigue failure start on the wire around the joint link. This means that every now and then, and at least after **500 hours of operation** the joint link should be driven forward in the drive unit in order to check the joint. At a starting wire break at the joint, the system must be shortened as described above. Thereby it can be avoided that the feeding-wire starts to flush and to be destroyed at a long piece.

9.3 Inspection of Feeding-wire

It is recommended to keep an eye on the condition of the feeding-wire and to check it at least at every **1.000 operation hours**. If the wire shows signs of wear - e.g. by bulges between the discs - it must be replaced at once.

If the wire often breaks, it is time for a replacement. **Do remember that in connection with replacement of the feeding-wire, the driving wheel must always be replaced or turned, if that has not been done previously.**

At driving wheels with loose discs it is recommended to turn or replace the discs on the driving wheel, because worn discs may have a unfavourable influence on the lifetime of a new feeding-wire (see section regarding turning of discs later in this manual).

It is very important to get a new wear surface on the drive unit in order to achieve the correct pitch and engagement on the wheel.

9.4 Maintenance of driving unit

The drive unit demands very little maintenance, but it is of course relevant to take off the front system and check a few things regularly and at least at every **500 operation hours**. Remember to disconnect the safety switch while the front plate is dismantled.

Check that the tension bracket slides easily on the two shafts. Lubricate with a little oil, if necessary.
Check the cabinet for possible dust and feed, for preventing tainting.
Check the driving wheel for wear. Turn or replace, if it is worn.
The gear on the drive unit is lubricated at delivery, and it is not necessary to replace the oil. Check that the gear does not leak oil.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

9.5 Turning the driving wheel

The driving wheel on the drive unit can easily be turned by dismantling the breaking part and the discs at the shaft end (pos. 1 and 2, Fig. 84). Then the driving wheel can be removed and the bush at the wheel nave can be moved to the other side (pos. 3, Fig. 84). The wheel can now be re-mounted. Do remember to lubricate the shaft with a little cupper grease.

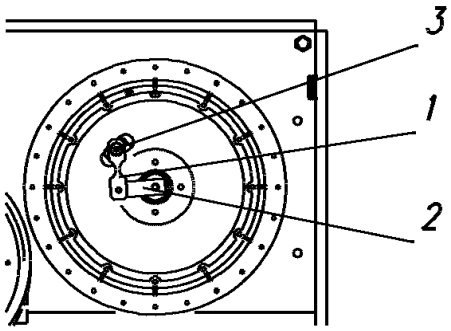


Fig. 84 Driving wheel can be turned

9.6 Turning of the discs on the driving wheel

In time the discs on the driving wheel may be worn out. They can be turned around one time, so a new wearing surface is available. The screws (pos. 1, Fig. 85) holding the discs are loosened and then each disc (pos. 2, Fig. 85) is turned a half round, and the screws are tightened again.

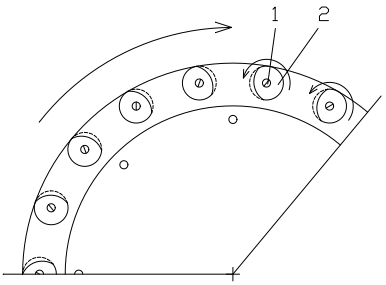


Fig. 85 The discs can be turned

9.7 Maintenance on hopper

The hopper is designed in such a way that the feed does not tend to accumulate in the hopper housing. Yet it is recommended to clean the hopper at least at every **1000 operation hours** in order to avoid that old feed becomes tainted. The frequency of this cleaning depends very much on the feed type. If e.g. much fat is used in the feed, it may be reasonable to clean more often.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

If a stone trap wheel is mounted on the hopper, it must be cleaned frequently and at least at every **500 working hours** in order to function satisfactorily.

The gear on a motor driven hopper, if any, is filled with oil at delivery, and it is not necessary to replace the oil, but check that the gear does not leak oil.

The nylon wheel driving the vibrator plate must be checked and adjusted to provide sufficient movement

9.8 Maintenance on corners

The corners are mounted with lifetime-lubricated ball bearings so that they need no re-lubrication. Normally maintenance of the corners is not necessary, but checks whether the corners make noise during operation, if so, the cover must be dismantled, and it must be checked whether something is stuck or the corner is turned incorrectly. Generally it is recommended to clean the corners at least at every **1000 operation hours**. It is also recommended, in this connection, to keep an eye on the wear of the wheels, as there is a risk of wearing out the corner housings if the wheels are not replaced in time. The wear is biggest on the last corners before the drive unit, meaning that this spot needs a special attention.

9.9 After adjustment of Feeding-wire tension

When the system has been running for some time, it is necessary to adjust the wire tension again, because the wire ends at the release rollers have stretched. Usually it can be seen that a row is not closing as much as other. Here only the row of turnbuckles in question is adjusted.

SKIOLD A/S
Kjeldgaardsvej 3
DK-9300 Sæby
Tel: (+45) 99 89 88 87
Fax: (+45) 99 89 88 77

10. Technical specifications

10.1 Noise

When the feeding system is running, the piping contains feed which reduces the noise, which makes the noise level below 70 dB. Furthermore the system is designed to function in housing, where the feeding system's contribution to the total airborne notice is minimum.

10.2 Motors

For data regarding motors we refer to data sheets of each component as well at the name plates of each motor.

Declaration of Incorporation of partly completed machinery

Acc. To the Machinery Directive 2006/42/EC, annex II B

Manufacturer:

Company Name:	SKIOLD A/S
Adress:	Kjeldgaardsvej 3
Post Code/City:	DK-9300 Sæby
Country:	Danmark
Tel:	+45 9989 8887

Hereby declare that the partly completed machine, meant only to be used in connection with SKIOLD TransPork, MiniPork, MultiChain, LineFeed and MiniFeed dry feeding systems:

Drive Unit, item numbers:	131050875, 131050811, 131063075, 131063011, 131110000, 181038002, 181050800, 181050802, 141050800, 141038000, 121038000, 121038001, 121050800, 121050801, 121063501, 121063511
Hopper, item numbers:	132000001, 132000010, 122038000, 122038002, 122038030, 122038032, 122050088, 122050089, 122050800, 122050801, 122050802, 122050803, 122050830, 122050832, 122063500, 122063502, 122063530, 122063532, 132310508, 132310600, 132310635, 132311635, 152000100

Is in conformity with and is designed and manufactured according to the following national and harmonized standards:

- COUNCIL DIRECTIVE of May 17th 2006 (2006/42/EC) regarding mutual convergence of the membership states machinery legislation (89/392/EØF with all later changes) with special reference to appendix 1 regarding significant safety- and health requirements in connection with design and manufacture of machinery (The Machinery Directive).
    - DS/EN ISO 12100-1:2003 Machine Safety – Basic terms and overall principles for planning, designing and shaping - Part 1: Basic terms and methods
    - DS/EN ISO 12100-2:2003 Machine Safety - Basic terms and overall principles for planning, designing and shaping - Part 2: Technical principles.
    - DS/EN 294:1994 Machine Safety. Areas of danger and safety distances. Hand and arm protection.
- COUNCIL DIRECTIVE of December 15th 2004 regarding mutual convergence of the legislation on electromagnetic compatibility (2004/108/EC). (EMC-Directive)
    - DS/EN 61000-6-3:2007 Electromagnetic compatibility. Generic emission standard. Part 1: Private homes, businesses and light industry
    - DS/EN 61000-6-1:2007 Electromagnetic compatibility. Generic standard of immunity. Part 1: Private homes, businesses and light industry
- COUNCIL DIRECTIVE of December 12th 2006 regarding mutual convergence of the legislation on electric devices meant for use within certain voltage spans (2006/95EC). (Low Voltage Directive)
    - EN60204-1/:2006 Machine Safety. Electric devices on machines. Part 1: General Requirements

This partly completed machinery must NOT be put into service before the complete machinery, in which this partly completed machinery is to be incorporated, has been declared in conformity with all relevant health and safety requirements according to 2006/42/EC and other relevant directives.

Title: Managing Director
Name: Samuel W. Andreasen
Company: SKIOLD A/S

Ikast, date. 01.05.2009

Signature