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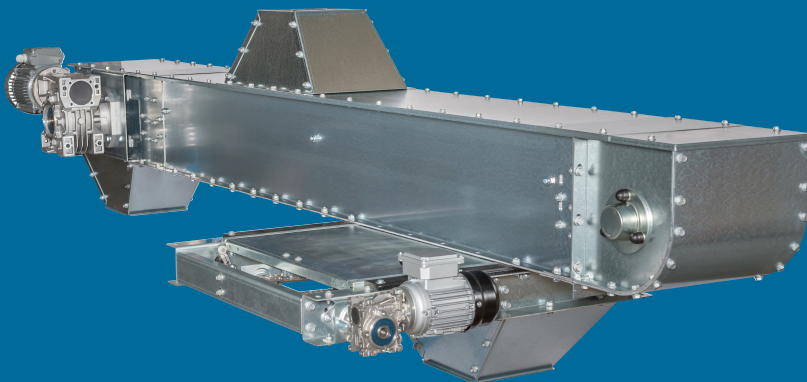


User manual

SRL60

Thank you for choosing SØBY
In order for the machine to function
optimally, it is important to forllow the
instructions in this manual.

Enjoy.



Introduction

Thank you for choosing SØBY.

It is very important that you read this user manual to obtain the necessary knowledge regarding installation, operation, service, maintenance, and dismantling. It is important to keep the user manual in a safe location for future use.

At SØBY we always work to improve our machines therefore we reserve the right to improve and update our products continually. This mean that some machine parts will be removed from the product selection, but it will always be possible to get a corresponding machine part for our machines. SØBY will always be ready to help and guide regarding our products.

Enjoy.

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General references



Please read the entire User Instructions before assembling and operating the installation.

If the purchaser makes any technical modifications to the machine, any warranty from SØBY will then be cancelled. The declaration will lose its validity.

The guarantee is only granted if the following conditions are met:

- The unit may only be used as described in this manual. Replacement of parts or changing the construction of the unit may cause the equipment to be re-certified.
- Installation, putting into service and operation by using this manual.
- Documentable compliance with maintenance intervals, cf. Instructions.
- Operation of the chain conveyor only by using motor protection or star Delta connection with motor protection.
- Use the original spare parts of the manufacturer only.
- All joints must be sealed with silicone in order to avoid dust emissions.
- Emergency stop must be installed in accordance with current standard EN 60204-1.
- By normal operation at the machine, see pictogram devices and read user/assembly instructions.
- When performing operations in areas where there is a risk of explosion, the safety of persons and equipment is subject to compliance with relevant safety regulations. Performing installation- and maintenance work in such areas implies a special responsibility for the persons performing the work. This work requires that the assembly- and maintenance personnel have thorough knowledge of laws, regulations and standards within the area. This construction gives a brief overview of the most important safety conditions in connection with the installation, maintenance and use of the equipment. Please pay attention to the fact that it is the responsibility of the end user to identify potentially explosive areas according to current regulations, with the following requirements for zone classifications and, if applicable, reporting to the local authorities.
- Repair, service and maintenance must be done carefully in accordance with the instructions of SØBY and must be performed by personnel who possesses the necessary qualifications in relation to the explosion safety of the equipment. Inspection and maintenance in respect of the electrical equipment must be based on the instructions in EN60079-17.

- During the lifetime of the chain conveyor and in connection with use in respect of the mechanical parts, special attention must be paid to the following:
 - Lifetime (see table)
 - Damages to parts and screens
 - Corrosion
 - Tightening of bolts and screws
 - Control of belts, including after-tensioning

- Modifications or alterations of the equipment, which influence the explosion safety of the equipment, are not allowed. Before using the equipment, check that the equipment is undamaged, assembled and installed as directed by SØBY.

Attention is particularly paid to:

- National security rules.
- National requirements to Safety and Health at places of work.
- National rules of installation for the type of installation in question.
- Recognized standards.
- Safety information in this manual.
- Data and information on the permissible installation and operating conditions on the equipment's rating plate.

The manufacturer reserves the right to make technical changes.

The machine can be used for conveying of feed, which causes an internal ATEX-zone 22. In case the machine is installed in ATEX zone, please select suitable gear and motor etc. for this purpose.

The machine can be used for conveying of the following material, with data as shown below. Materials beyond this must not be used in this machine:

- Grain, mixed dust
- Flour
- Minerals
- Soya bean meal
- Rape/beans
- Feed pellets and wooden pellets up to 8mm in diameter

	Particle Size [μm]	Ignition temperature Dust cloud [$^{\circ}\text{C}$]	Ignition temperature 5mm layer of dust [$^{\circ}\text{C}$]	LEL [g/m^3]	MIE [mJ]	Kst [bar m/s]	Reference
Limit values	12	400	280	30	50	131	-

If the medium being conveyed contains stone or metal parts, the explosion safety of the equipment cannot be guaranteed.

Must comply with EN 60079-10-2:2015 concerning explosive atmosphere/dust atmosphere.

Safety instructions



The instructions and especially the safety information must be read carefully prior to assembly, commissioning, operation and maintenance.

All plants and components must be installed in accordance with the applicable accident prevention regulations.

The machine must be shielded correctly in relation to the current Machine Directive, and as such make it impossible to get in touch with moving parts. The shielding may only be removed by using tools. These must be fitted before the machine is put into operation.

The motor must be properly protected with overload protection equipment, and the chain conveyor must be properly fitted with a suitable potential equalization.

For any repair or maintenance, disconnect the power source from the drive motor.

Intermediate outlet may start automatically. Beware of fingers and limbs. The intermediate outlet must be connected to lockable main circuit breaker.

When the chain conveyor is running you should not be able to put your hand or fingers into the drive device or elsewhere.

There must always be shielding over pit down to the inlet, and here there is a requirement for an applicable mesh size of up to 120mm, with a safety distance of minimum med 850mm. This must be observed in relation to DS/EN ISO 13857.

Shields such as guard for belt and shields for inlet for prevention or elimination of risks must be maintained on a regular basis.

The machine must be installed in a way that provides good ergonomic conditions for service of the machine.

The safety equipment that has been removed during repair, cleaning and maintenance work must re-established before the plant is put back into operation.

All screws, bolts and attachments must be properly tightened.

If the machine is stuck / is clogging, the transmission might be overheated.

The chain conveyor must only be put into operation, when it is assured that it is not defective. The operator is obliged to only operating the installation when it is in perfect condition.

SØBY is not liable for damages arising from abuse or technical alterations of the installation and breach of the instructions given in this user guide.

If the chain conveyor is placed in areas classified as potentially explosive, specially approved motor and gearbox must be used for the zone in question. If you have any questions, please contact SØBY for further information. It must be ensured that the ambient temperature in the area, where the equipment is installed, remains within the permitted limit values of the equipment $-20^{\circ} \leq TA \leq 40^{\circ}$. Therefore, when installing the unit, it is necessary to consider any external heat sources that may affect the ambient temperature in the area where the equipment is installed.

During any work with the chain conveyor there must be adequate work lighting.

During any work with the machine, respiratory masks, safety shoes, hearing protection and other required safety precautions that may be required by the local workplace assessment should be used, where the chain conveyor is installed.

When assembling machines, heavy lifting may occur. Persons setting up the machine must read the assembly /user manual first. Suitable lifting equipment must be used in connection with installation and assembly.

Gloves must be used while handling the machine as there is a risk of sharp edges.

The equipment must not be exposed to larger dust loads (dust layers) than permitted in EN60079-14.

Beware that if the chain conveyor is expected to run empty for more than 5 minutes, a dry-running sensor must be fitted to ensure that the machine stops. Also, it must be ensured that the machine outlets are not clogged. As SRL60 chain conveyor as standard is not mounted with an overflow sensor, it will depend on the motor protection if the chain conveyor is clogged.

Use of the machine

The chain conveyor is designed for conveying of grain and almost all seeds and flour products within agriculture.

(see material specifications in general references).

The chain conveyor may **not** be used for tasks beyond these.

The chain conveyor is driven by a gear motor. It moves the conveying material from an inlet to an outlet.

The complete installation must be observed in accordance with the applicable regulations in this manual and in accordance with the applicable Machine Directive 2006/42/EC.

The chain conveyor can have a speed of 0,57-1,11 m/sec.
Maximum length of 35 m.

Explanation of the Pictogram



Prior to repair, maintenance and cleaning work, turn off the motor and unplug the power cord.

Moving parts can be dangerous.

They are only to be touched when they are completely at ease.

All shielding must be mounted before you start the machine.



Grease injector

Specifications

Conveying capacities (0,75 t/m³ dry and cleaned grain)

SRL60 Chain conveyor = 60 t/hour

Construction of module

The chain conveyor SRL is constructed in modules, so that the desired lengths can always be obtained with a tolerance of 25 cm.

Outlet sections

If you want to use intermediate outlets, outlet sections can be placed between the extensions.

Opening and closing of the outlets can take place on site either by manually operated outlets or by outlets for remote control. Operation will then take place through a wire from an accessible position. Can also be automatically/electrically operated.

Ascending conveying

The chain conveyor can be used for slightly ascending conveying of up to approx. 7°.

If larger ascending than usual is required, we recommend using a chain conveyor (10°-30°) with extended flights and intermediate bottom.

For conveying with ascending more than 30°, we recommend using bucket elevator + horizontal chain conveyor.

Reversible conveyors

In many cases it might be appropriate that the conveyor can convey in both directions, i.e. that the inlet is placed in the middle of the conveyor and this then conveys to either side, respectively. In the case of conveyors below 20 m, this can be carried out just by installing a pole switch in the electrical connection, and by installing an outlet section before the tail section. In these cases, please note that the chain must be kept tighter than usual as a slack chain might cause damages to the conveyor.

In case of longer conveyors, please contact SØBY.

Pipework

All kinds of piping to inlet and from outlet can supplied for the chain conveyor.

SRL60 inlet is standard with Ø250 in- and outlet.

SRL60 (10°-30° ascend or with 30° bend) is standard with outlet Q24.

Piping requires a 45° fall for grain and the like to be able to slide. When working with seeds and hard flowing products, the sliding angle is somewhat larger.

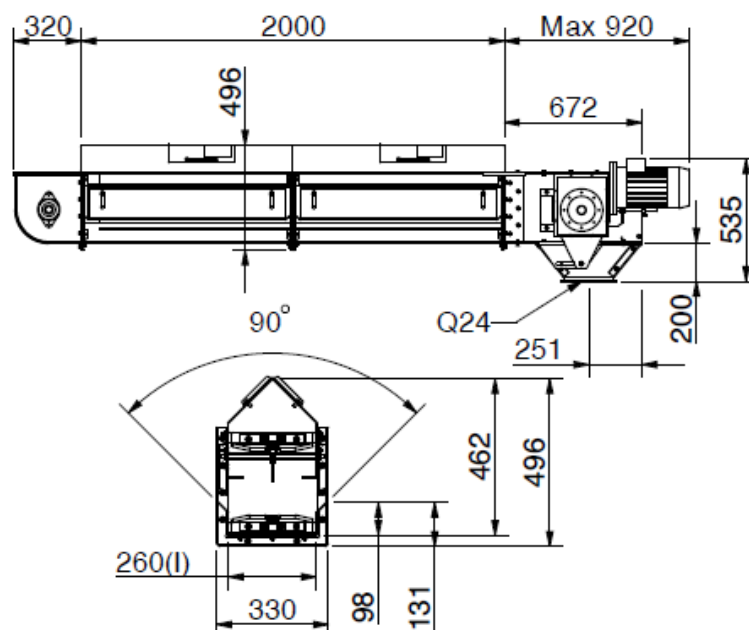
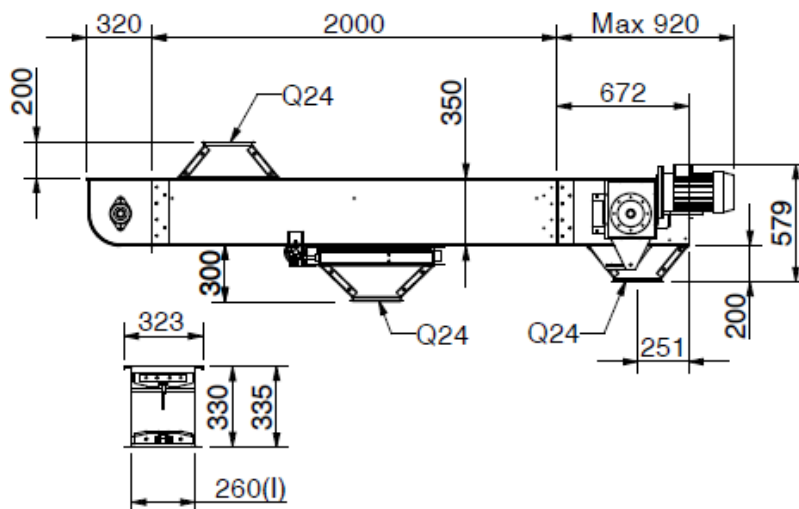
Technical data

Technical data

Noise level: Operation with grain 76 dB(A)
 Without grain 70 dB(A)

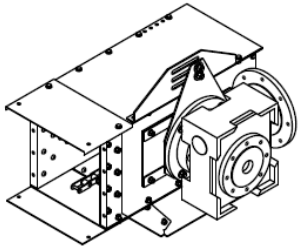
Motor capacity: Between 2,2 kW and 7,5 kW. See the data plat of the motor for further information.

Gear: Varvel RT/RS
 Synthetic gear oil ISO VG 320 "long-life" oil

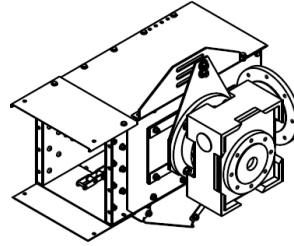


Description of components

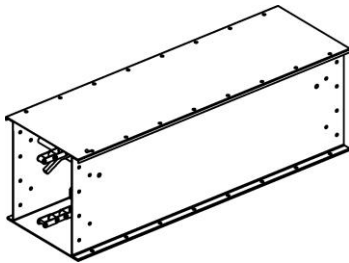
Drive-tension section with worm gear



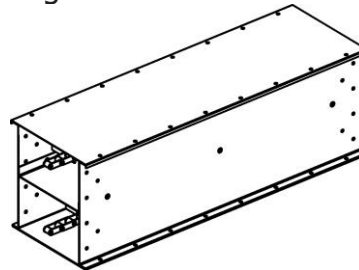
Drive-tension section with worm gear for 30° ascend



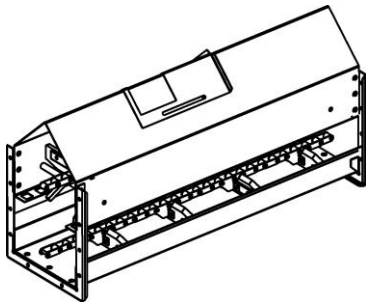
Extension including chain



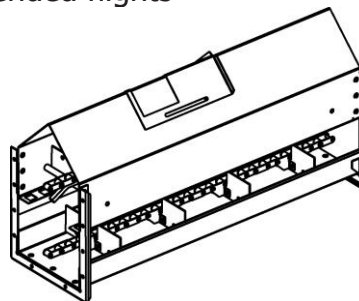
Extension with intermediate plate including extended flights



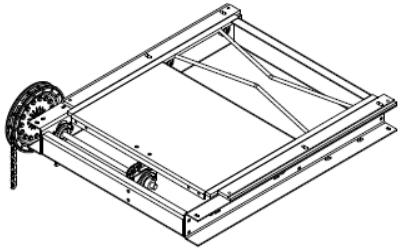
Extension with side inlet including chain



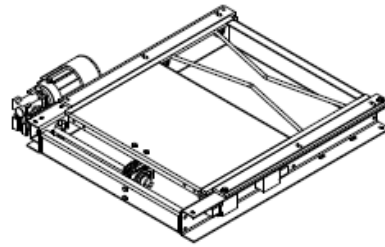
Extension with side inlet including chain with extended flights



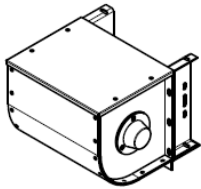
Intermediate outlet manually operated



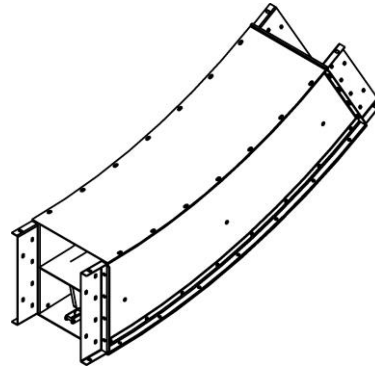
Intermediate outlet motor operated



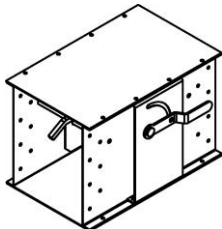
Tail section



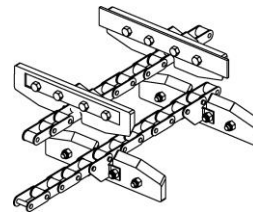
Extension as bend



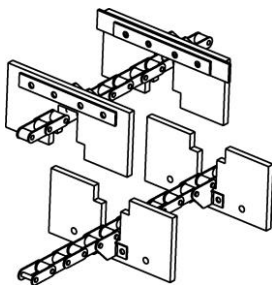
Flow regulator



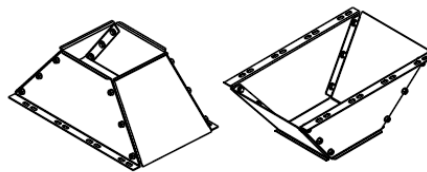
Chain for horizontal conveying



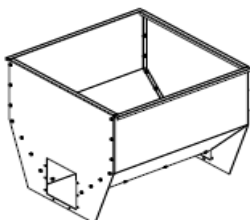
Chain for inclined conveying



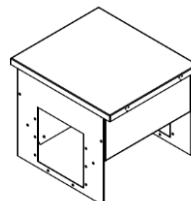
Inlet/outlet



Tip box



Inlet box



Mounting of SRL60

Mounting of the chain conveyor as described in this section is a guideline from SØBY. If this is followed, you are ensured a safe and uniform assembly of the chain conveyor. The machine can also be assembled in other ways. Mounting of the chain conveyor may only be carried out by specially trained personnel.

The SRL60 chain conveyor is supplied in separate parts. Before starting the mounting please control that all parts are complete and supplied according to the order.

Calculate the assembly order of drive-tension section, extensions and outlet sections.

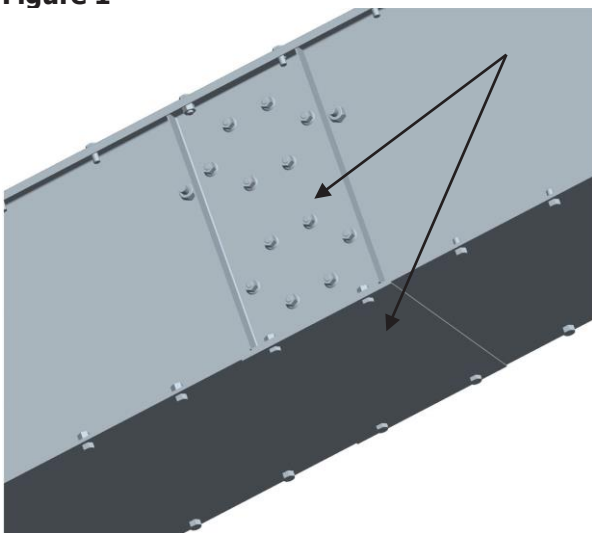
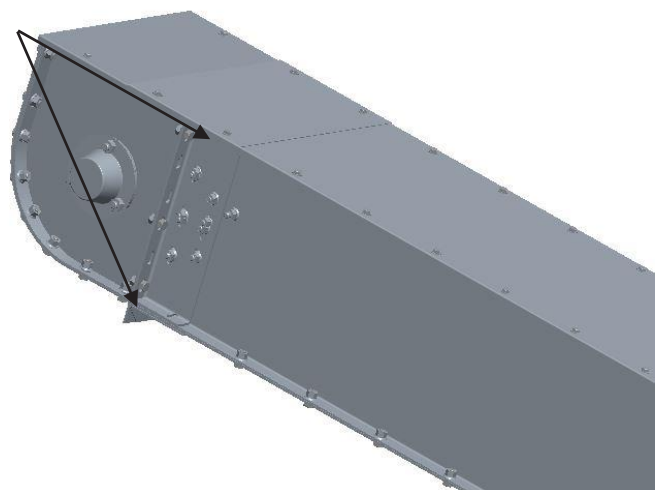
When the assembly order has been defined, dismount all the covers on extensions and outlet sections, and remove the chain and the assembly components.

The chain conveyor must be supported for minimum every 6 meters.
If the chain conveyor must be mounted at the top of a building, the supports can optionally be designed as hangers hanging down from the rafters, or the chain conveyor can be laid directly on the beams of the roof structure.

The extensions and outlets are assembled in appropriate lengths and put in place and assembled with the other pieces.

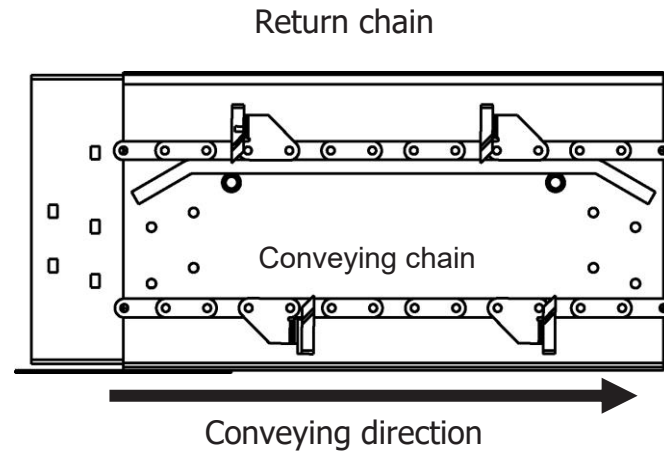
Standard extensions are bolted together with assembly plate at the side and at the bottom (see fig. 1)
At the tail section and at extensions with side inlets, brackets are mounted instead of plates (see figure 2).

The drive-tension section is mounted at the outlet end and the tail section at the opposite end.

Figure 1**Figure 2**

When the sections have been assembled and put in place, the chain is put in and pulled around the chain wheels at the ends; please note the assembly of chain compared to the direction of rotation (see figure 3).

Figure 3

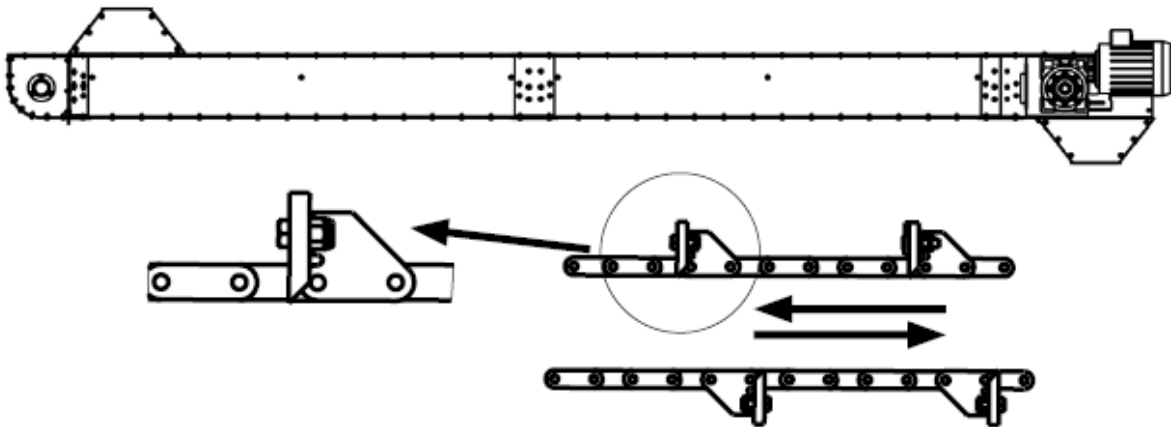


Mounting of return buckets

Here is described in which cases it is necessary to mount return buckets and when it is not.

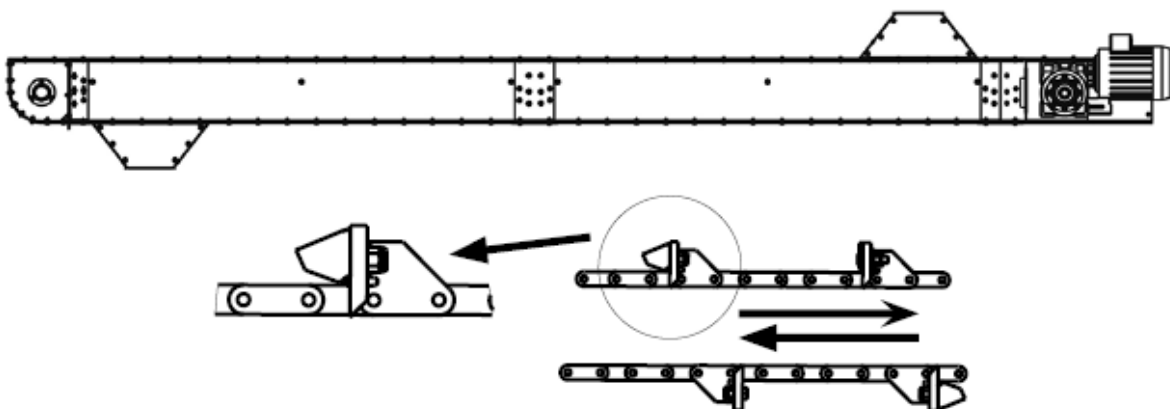
When return buckets are to be mounted, one return bucket is usually mounted per 4 m running chain.

Standard chain conveyor without return buckets.

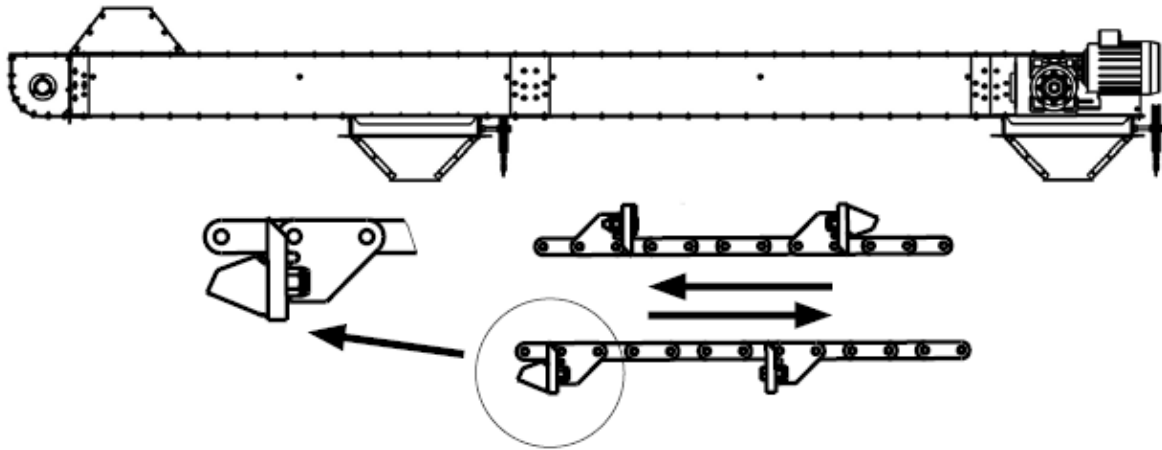


Standard chain conveyor with reversed direction of conveying. Mounted with return buckets.

Please note that the chain direction is the same as standard.

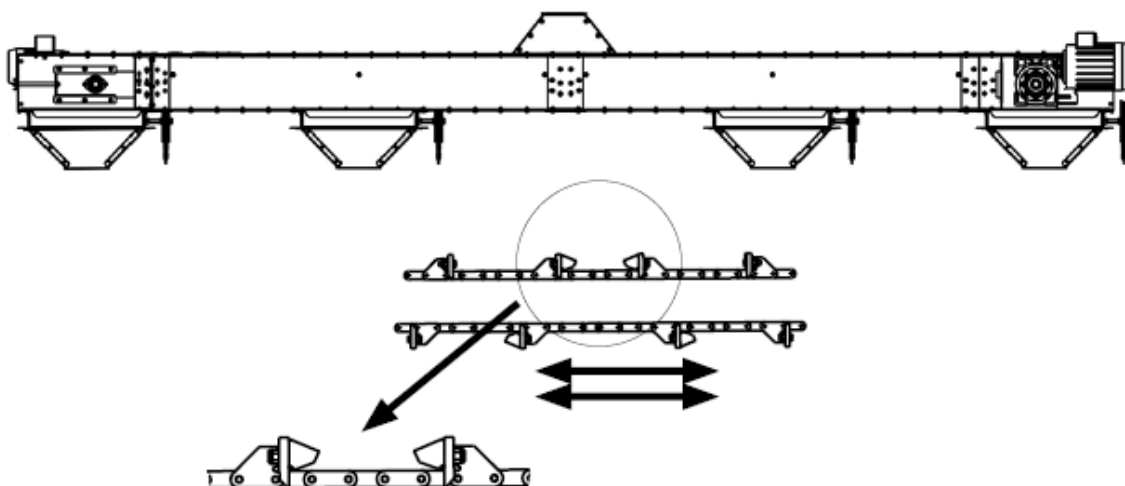


Chain conveyor with intermediate outlet, and with intermediate outlet under the drive-tension section. Mounted with return buckets. Please note that the chain is reversed compared to standard chain conveyor.



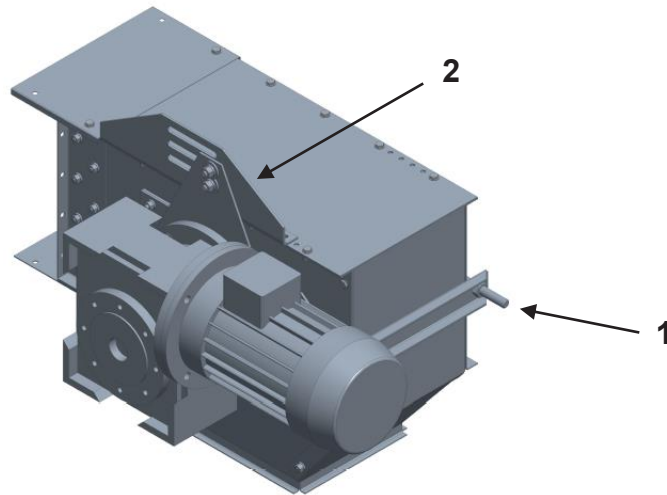
Chain conveyor reversible with intermediate outlet at both drive-tension sections. Mounted at return buckets.

Please note that every 4m chain is reversed.



The chain tensioning bolts are loosened to the maximum and the chain is tightened with tackle or clamp and the chain is assembled with the supplied connectors. Thereafter, the chain is adjusted with the tensioning bolts (figure 4 position1). Remember to loosen the motor bracket (figure 4 position2).

Figure 4



If the chain conveyor must be placed outside, the electric motors must be protected against moisture, for this purpose we can supply rain covers.

When the rain cover must be mounted this replaces the normal gear console (see figure 4), as the rain cover itself is both cover as well as gear console (see figure 5,2).

The rain cover is easy to mount, and with the tilting (see figure 5, 3) it is possible to make further service without removing the cover.

Figure 5, 1

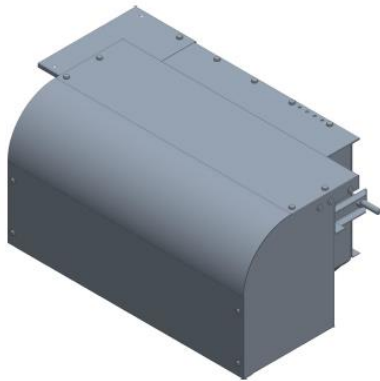


Figure 5, 2

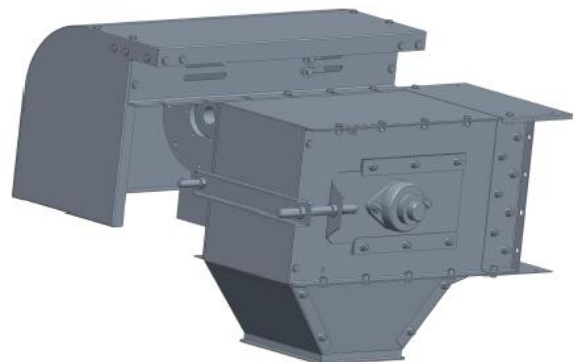


Fig. 5, 3

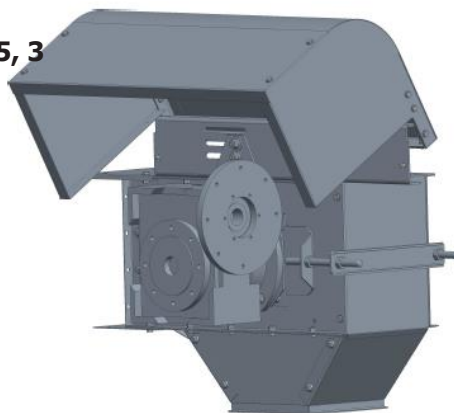
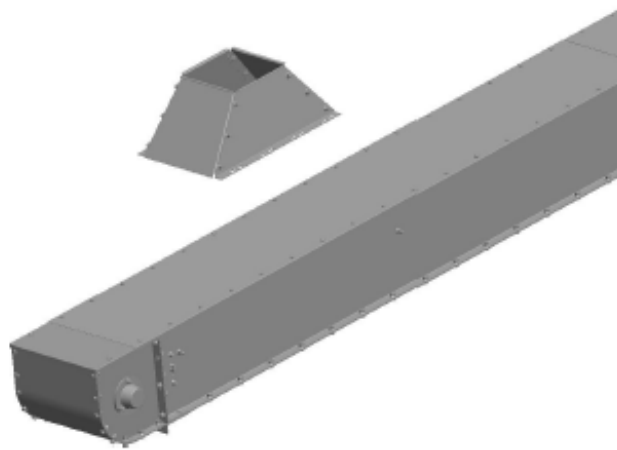


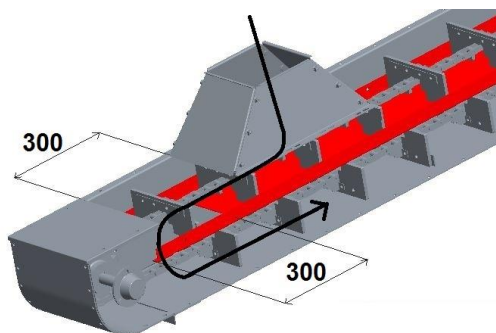
Figure 6 shows a horizontal chain conveyor
The covers for the extension sections and the outlet sections are mounted.
Where the inlets are to be placed, a hole is cut in the cover to fit with the transition in
question (see figure 6).

Figure 6



If the chain conveyor must be placed in an angle of 10° - 30° , a chain conveyor with intermediate plate and extended flights is used. The inlet hopper is placed minimum 300 mm from the tail section. A hole must be cut in the intermediate plate so that the conveying material (grain) will come down through the inlet hopper, lands on the intermediate plate and is being conveyed by the return flights down through the hole to the lower chamber (see figure 7)

Figure 7

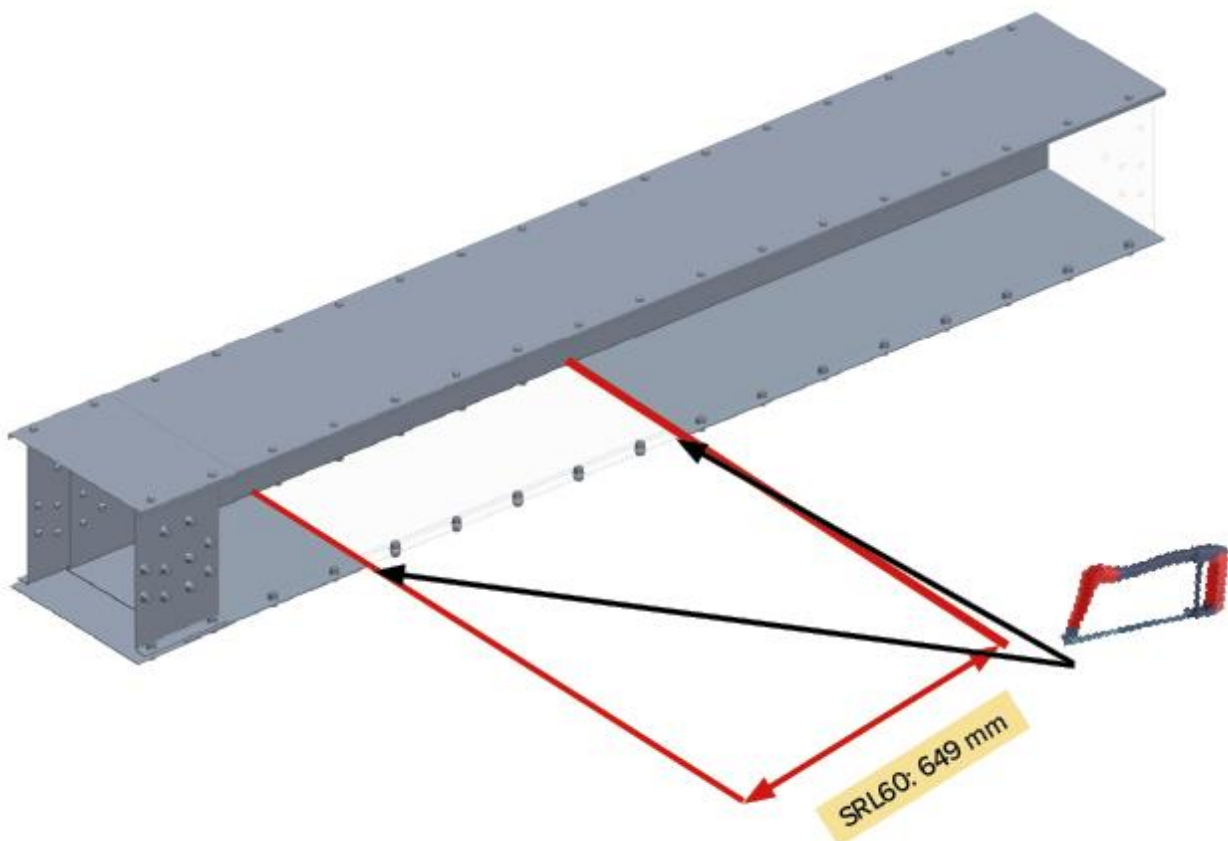


Mounting of intermediate outlet

In this section you will find a small explanation with text and pictures, where an intermediate outlet is mounted on a chain conveyor. An intermediate outlet is available both as manual, remote or motor controlled. The intermediate outlet can be supplied with an end stop switch, which will signal to the control of the conveying unit about the position of the slide (open/closed).

The end stop switch set is always included in a motor operated intermediate outlet.

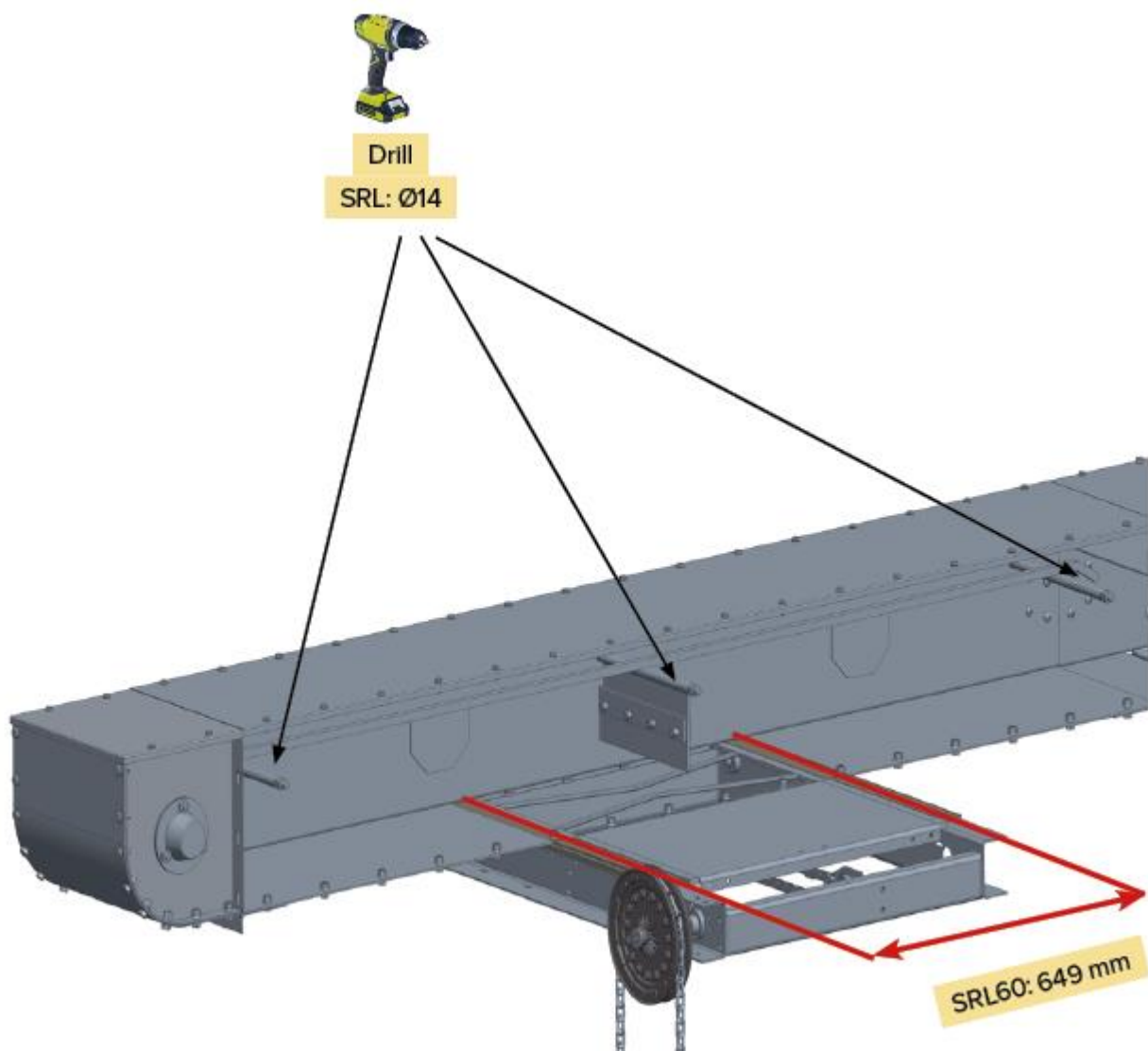
Figure 8



When mounting the intermediate outlet, the bottom plate must be cut out and removed from where the intermediate outlet should be placed. The dimension of the hole to be cut for the intermediate outlet must be the same as the width of the intermediate outlet + 5 mm (see drawing below).

The intermediate outlet must be mounted directly upon the flanges at the sides of the chain conveyor. This gives a flat bottom when the slide is closed. The outlet cleaner must be placed above the place where the intermediate outlet is mounted, at the same height as the chain guard, and in the middle above the intermediate outlet. (see picture).

Figure 9

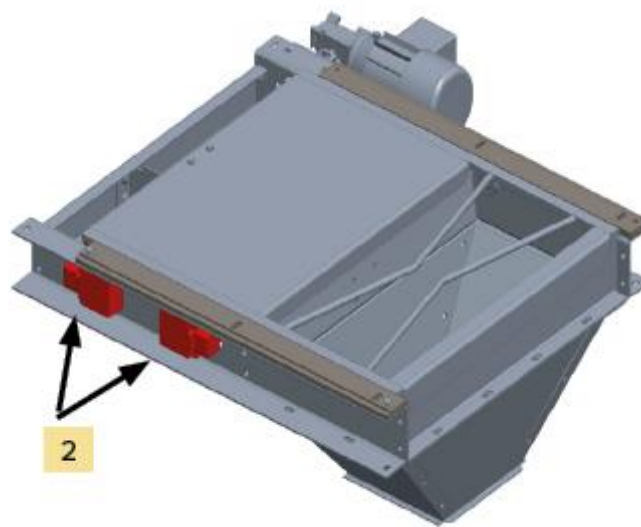


If end stop switches are to be used, these must be mounted as shown in the picture below. The arms of the contacts must be installed in a way that a signal is given both at the open and closed position.

When ordering a motor-operated intermediate outlet, the end stop switches are mounted in a standard position from SØBY. When electricity is connected, adjust the contacts to the desired position.

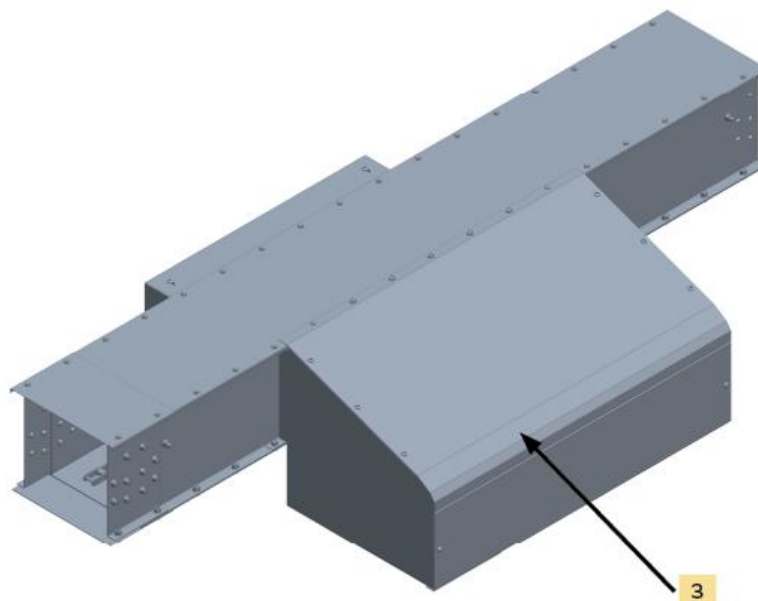
NOTE: It is important to emphasize that the slide on the intermediate outlet must not come to a physical stop as this could damage the engine.

Figure 10



SRL60

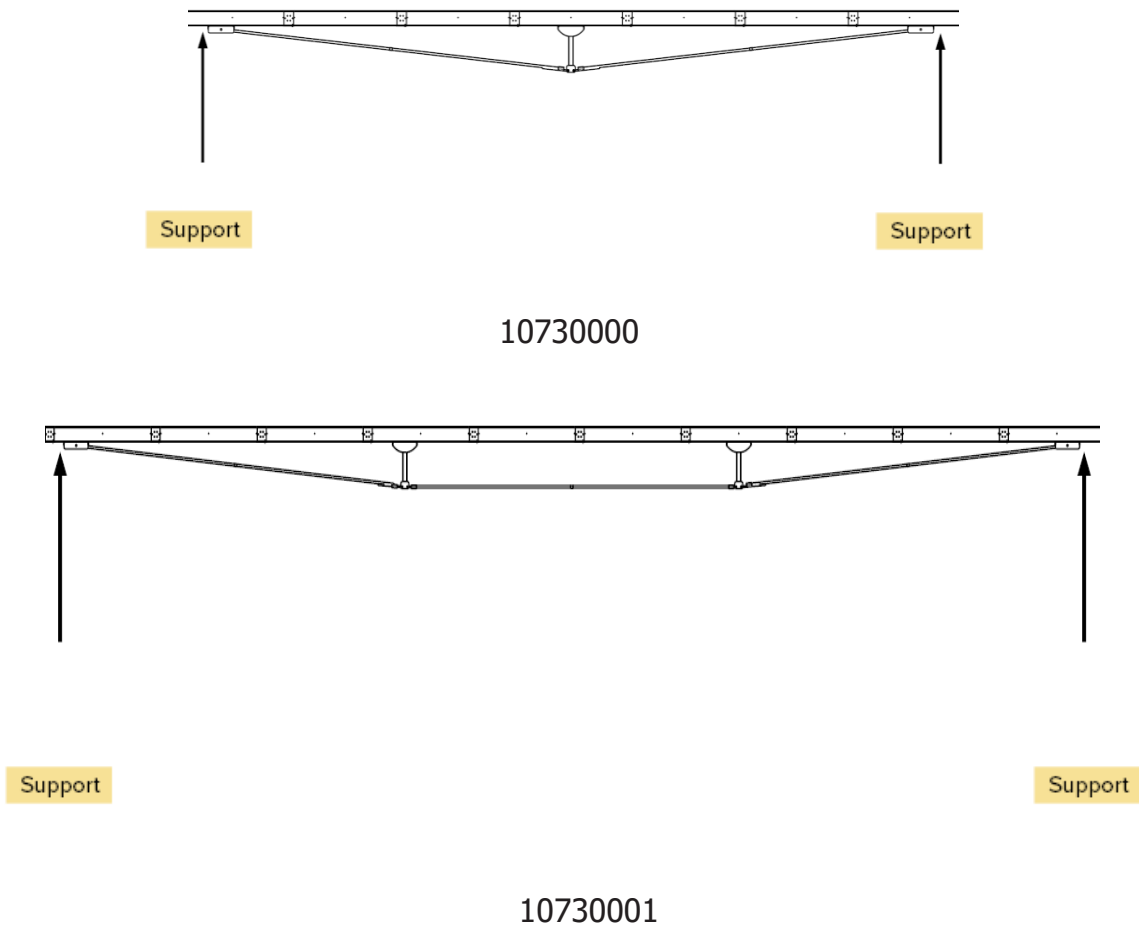
Figure 11



Mounting of bracing supports

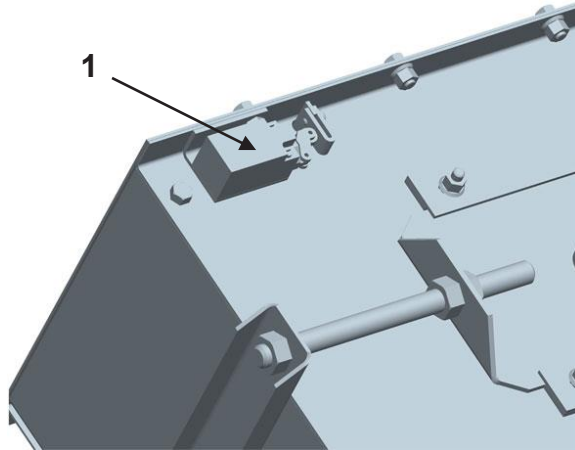
Figure 12 shows how a SØBY chain conveyor must be supported when mounting bracing supports.

Fig. 12



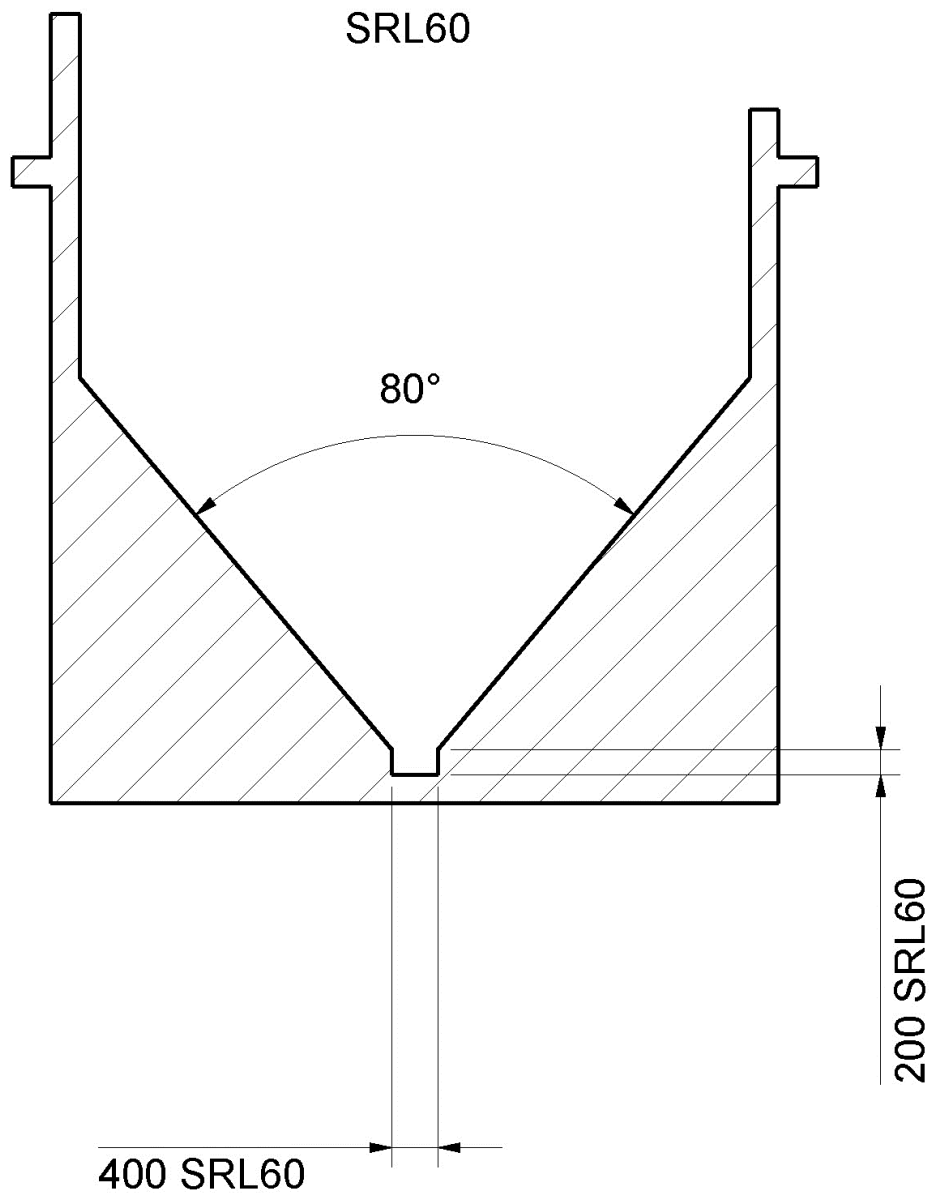
If the chain conveyor is ordered with an overflow switch (sensor), this is placed on the drive section. (See figure 13 position 1). Electricity connection – see supplier instructions.

Figure 13



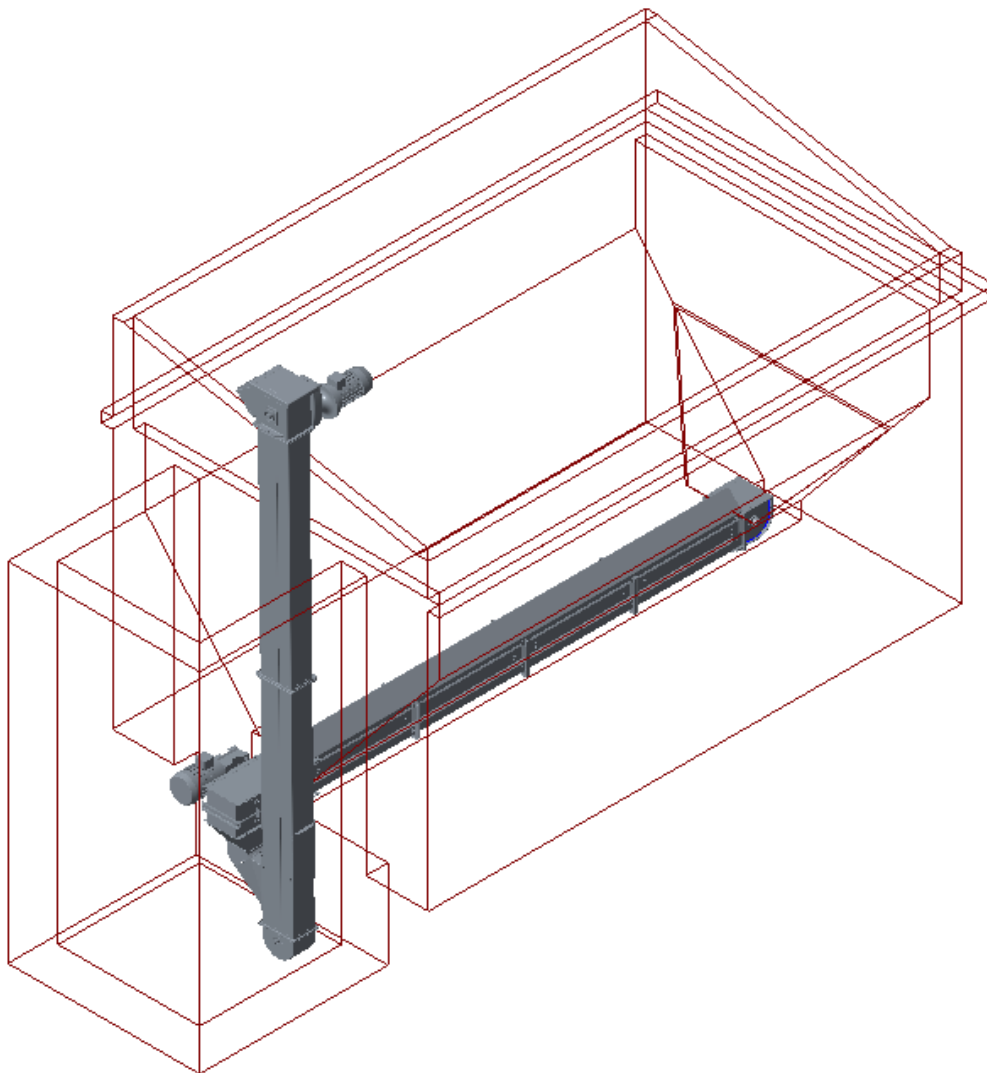
Pit conveyors are assembled in the same way as standard chain conveyors. Regarding pit, it is important that the slope of the sides is maximum 80° in order to enable the crops to slip freely to the chain conveyor. Between the inclined sides of the conveyor and the concrete, cover plates, which are fastened to the concrete, must be mounted. Dimensions for casting are as shown in figure 14.

Figure 14



Normally a service pit is established in continuation of the pit, where interconnection with e.g. an elevator can be made. Construct this pit as large as possible enabling you to service the chain conveyor as well as the elevator (see figure 15).

Figure 15



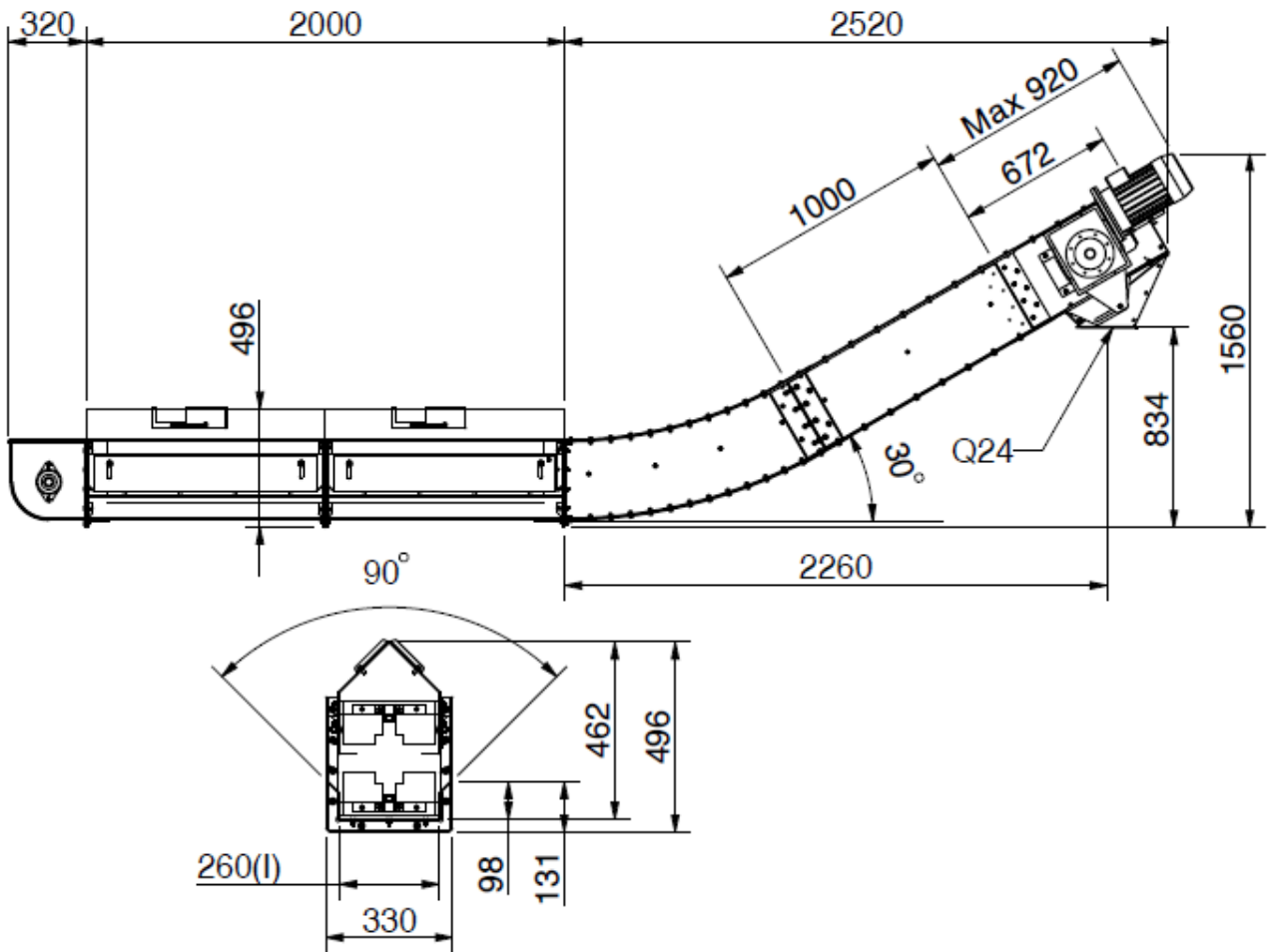
If there are problems with the groundwater when digging a service pit, or if you want to use a pit conveyor together with a tip box placed on a level floor, you can use an extension with bend and a modified outlet.

This raises the outlet of the chain conveyor (see figure 16).



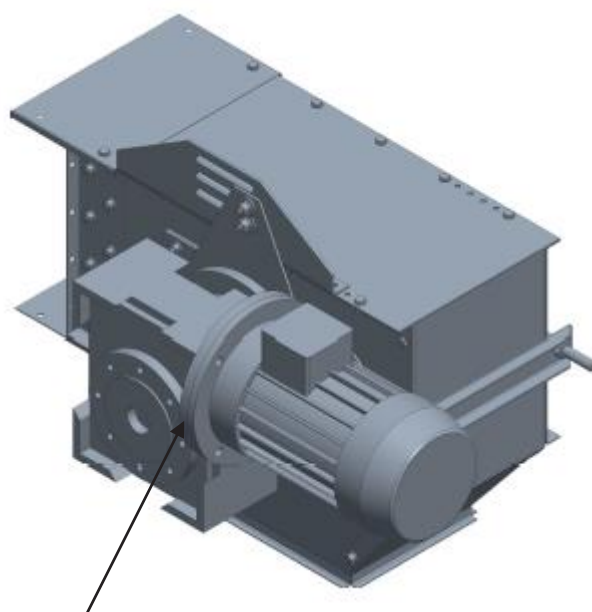
When using bend, you use chain with extended flights and intermediate plate.

Figure 5



Sealing of flange between gear and motor

The assembly must be sealed at the upper side in order to avoid entering of water.



Tætning her



Electrical equipment

The electrical connection to the machines delivered by SØBY may only be performed by specially trained staff.

During installation, please be aware of the voltage and data indicated on the data plate. The terminals of the motor are connected according to the instructions on the motor data plate. The motor is secured with a thermal protection and a lockable circuit breaker, as otherwise the warranty from the motor manufacturer will be cancelled (this equipment is not included in the delivery).

Installation and connection of the unit must take place in accordance with national rules of installation, supplemented by the demands stated in the heavy current regulations, EN60204-1 and EN60079-14. Starting up the electrical parts and subsequent maintenance must be in accordance with the instructions in EN60079-17.

If a frequency converter is installed, it is necessary to observe carefully data from the converter and the data plate. Pay attention to the labeling of electrical components in classified areas.

When connecting the chain conveyor, make sure that the direction of rotation of the chain conveyor fits with the direction of conveying desired.

Potential equalization:

The connection must be carried out in accordance with the instructions in EN60079-14.

Operating and commissioning

During operation of the chain conveyor, the applicable regulations for prevention of accidents must be observed.

Add conveying material to the chain conveyor and check if this can run off freely.

Avoid as far as possible operation with an empty chain conveyor as this causes considerable wear of material and bearings, and this will generate significantly more noise from the chain conveyor.

During normal operation, the chain conveyor will only be filled to the middle of the chain conveyor. The filling height will, however, depend on the crop.



Maintenance

During maintenance work, the precautions described in the safety instructions must be observed.

The chain conveyor is worn, depending on amount of dirt in the material conveyed, and must be checked once a year for abrasion or damages. Foreign objects, such as pieces of wood, stone or iron, may cause damages.

If foreign objects are stuck in the chain conveyor, these can be removed by using appropriate tools, but under no circumstance by your own hands. If necessary, disassemble the chain conveyor. Parts that might be worn are replaced at the same time.

However, foreign object should always be avoided.

Please note that the safety of motors, gear and bearings is subject to compliance with maintenance intervals/replacement.

The electrical motors are dimensioned in a way that they cannot be overloaded during normal operation, if they have been correctly mounted and installed. The motor protection circuit breaker will disconnect the power supply if the motor is overloaded or in case of power supply fault. Fuses and motor protection circuit breaker must be controlled and replaced by specially instructed staff if necessary.

The chain tension must be checked regularly at an interval of every 100 hours; this is done by disassembling the covering plate at one of the center sections, and thus you can lift up the chain and check the tension and the tightening of the chain.

The following equipment on the unit is maintained with the following intervals:

Equipment	Manufacturer	Maintenance Requirements	Interval of maintenance
Bearing at drive-tension section	PTI	Control of abrasion, packing and discoloration	Must be replaced for every 10.000 operating hours
Bearing at tail	PTI	Control of abrasion, packing and discoloration	Must be replaced for every 10.000 operating hours
Drive chain	SØBY	Control of tension	Tension is controlled for every 100 operating hours
Drive chain	SØBY	Sign of abrasion or weakness in chain links	Controlled for every 1.000 operating hours or once a year for signs of abrasion or weakness in chain links. Must be replaced for every 20.000 hours
Motor	Cantoni /techtop	Inspect motor and remove layer of dust or similar on a regular basis	Bearings must be replaced for every 25.000 operating hours
Worm gear	Varvel	Control of abrasion, layers of dust and leaks	It is important to emphasize that the explosion safety is subject to the maintenance required below: Dust layer more than 5 mm must be removed by a vacuum cleaner. Every 6 months a visual inspection of oil seals must be carried out, and in case of signs of abrasion, the seal must be replaced. Also, a regular control of noise is carried out



Cleaning

The chain conveyor should be cleaned regularly in order to avoid product mixtures, formation of bacteria and damages of the product.

In order to avoid overheating, dust layers at motor and gears must be removed regularly.

At least once a year the chain conveyor should be cleaned and inspected for faults and abrasion.

Cleaning is necessary when changing crops in order not to mix these.

When conveying highly adhesive products such as rape, corn, soya bean meal and the like, all inlets and outlets must be controlled for free passage.

Check that the carriers are in good conditions and that the cleaning tape (belt) on every fourth carrier is not defect, otherwise they should be replaced. Also, it must be checked that the chain is not stuck.

During cleaning the precautions described under safety instructions are carried out.

Troubleshooting

Defect	Possible cause	Remedy
The chain conveyor does not start	The power supply is disconnected	Check electric power cable and replace if necessary
	The motor fuses are defective	Replace fuses
	The motor safety switch is defective	Replace the motor safety switch
	The motor is defective	Replace the motor
	A foreign object blocks the chain conveyor	Remove the foreign objects with suitable means
The motor stops / is overloaded	A foreign object blocks the chain conveyor	Remove the foreign objects with suitable means
	The outlet is blocked	Clean the outlet
	Too much conveying material in the chain conveyor	Adjust admission to smaller quantities of conveying material
	The power supply is disconnected	Check electric power cable and replace if necessary
	The motor fuses are defective	Replace fuses
The chain conveyor does not convey / conveys irregularly	The drive shaft is broken	Replace the drive shaft
	The conveying material is too polluted	Clean the conveying material
	The conveying material is too moist	Dry the conveying material
	Insufficient conveying material available	Add conveying material

Residual risk

The chain conveyor is produced in accordance with the safety and health requirements which are set out in the ATEX and in the Machinery Directive and in accordance with the consequently harmonized standards. If these regulations are disregarded, the chain conveyor might be a danger to the operator or to the life or limb of a third party. See Declaration of Conformity.



Declaration of Conformity

The Company
Søby Maskinaktieselskab
Viborgvej 306
DK-7840 Højslev
Denmark

Hereby declares that this machine type supplied by **Søby Maskinaktieselskab**

type: SR25-SR40 & SRL60

Complies with the following normative documents:

DIRECTIVE 2006/42/EC	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery, and amending Directive 95/16/EC
DIRECTIVE 2014/34/EU	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres
DS/EN ISO 12100:2011	Safety of machinery – General principles for design – Risk assessment and risk reduction
DS/EN ISO 13857:2019	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs
DS/EN IEC 60079-0:2018	Explosive atmospheres – Part 0: Equipment – General requirements
DS/EN ISO 80079-36:2016	Non-electrical equipment for use in potentially explosive atmospheres Part 1: Basic method and requirements
DS/EN ISO 80079-37:2016	Non-electrical equipment for use in potentially explosive atmospheres Part 5: Protection by constructional safety 'c'
DS/EN ISO 1127-1:2011	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

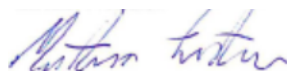
The electrical components mounted on this machine type complies with the following normative documents:

DIRECTIVE 2014/30/EU	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
DIRECTIVE 2014/35/EU	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
DIRECTIVE 2011/65/EU	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

This machine is designed for equipment group II category 3/- D and have the following marking.

   II 3D/- Ex IIIC 135C° Dc/- X

Højslev, Nov-22



Morten Frantsen
Co-Owner

Supplier instructions

Potential equalization:

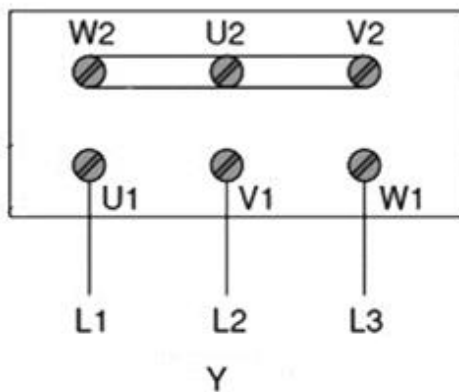
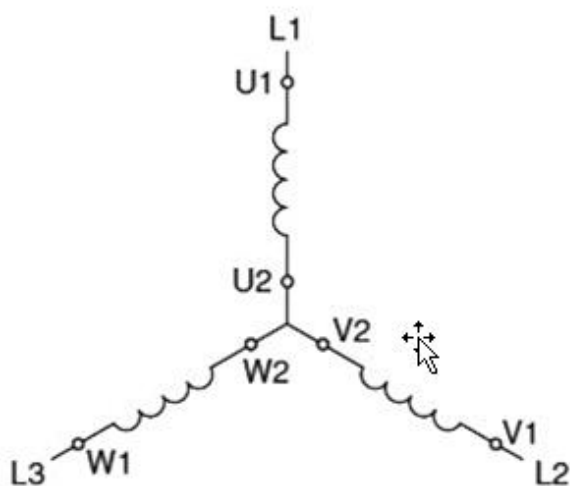
There is a terminal for connecting the equalization connection in the terminal box of the motor. The connection must be carried out in accordance with the instructions in EN60079-14.

Connection diagram for Cantoni motors for either star or triangle connection.

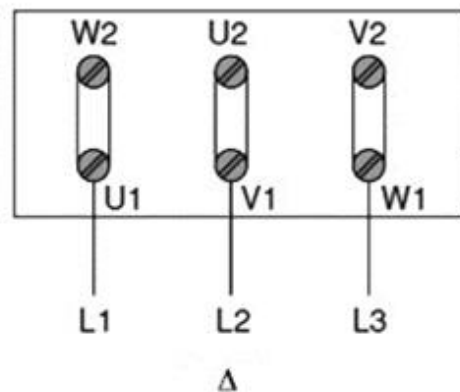
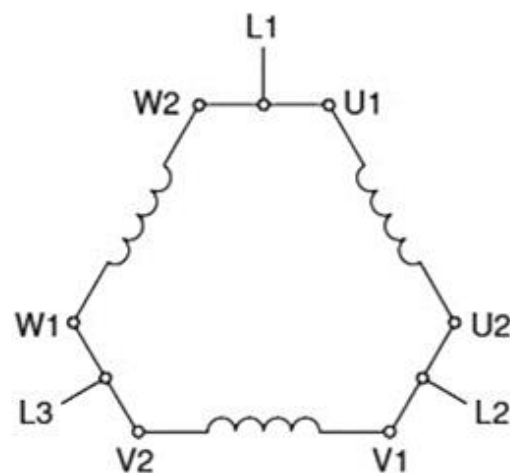
Standard motor terminal connection diagrams

3-phase single-speed motors:

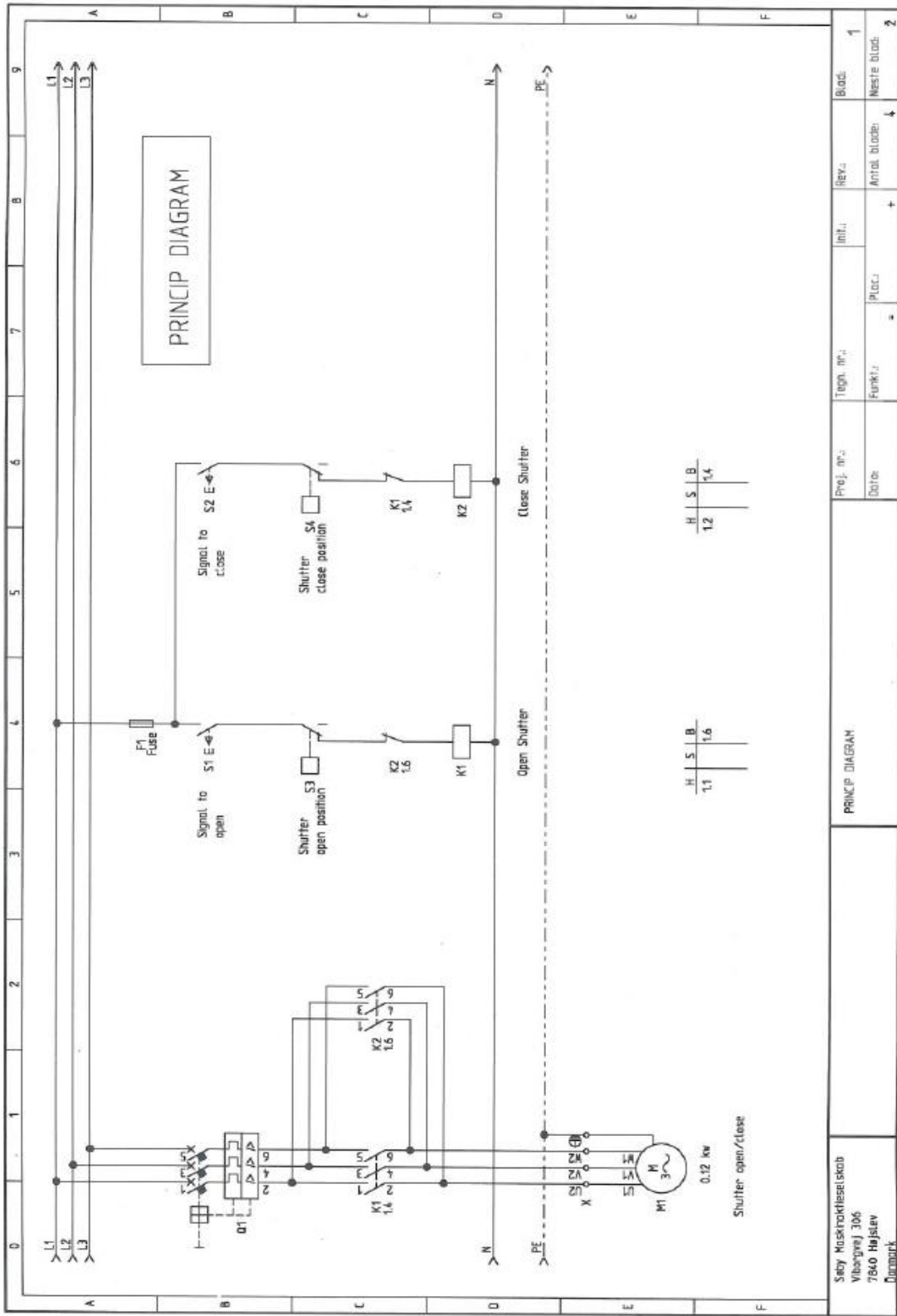
Connection in a Y



Connection in a Δ



EI-diagram for spjæld



Vægt & olie mængder



Working Instructions & Maintenance

Lubricants

Vægt & olie mængder

RS-RT	kg	l
28	1.1	0.03
40	2.5	0.08
50	3.8	0.13
60	6.5	0.20
70	9.0	0.35
85	13.5	0.60
110	39.0	1.50






Anbefalede typer

Enhederne bliver leveret fyldt med syntetisk olie med lang levetid.

Den sikre drift af enhederne med ISO VG 320 grader smøremiddel er anbefalet inden for følgende temperaturer.

-20 e +55 °C.

Temperaturer udover dette kræver specielle anbefalinger, og der henvises derfor til Kundeservice.

Type	ISO VG								
Syntetisk olie	320	Degol GS 320	Energol SG-XP 320	Alphasyn PG 320	Glycolube 320	Glygoyle HE 320	Synlube CLP 320	---	Tivela SC 320
Fødevaregodkendt Syntetisk olie	320 460	Eural Gear 460	---	Vitalube GS 460	Gear Oil FM 460	Mobil DTE FM 460	---	---	Cassida Fluid GL 460

Safety Precautions

Be sure to read the precautions for **All Safety Limit Switches** in the website at: <http://www.ia.omron.com/>.

Indication and Meaning for Safe Use

⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.
Precautions for Safe Use	Supplementary comments on what to do or avoid doing, to use the product safely.
Precautions for Correct Use	Supplementary comments on what to do or avoid doing, to prevent failure to operate, or undesirable effect on product performance.

⚠ CAUTION

Electric shock may occasionally occur.
Do not use metal connectors or metal conduits.



Precautions for Safe Use

- Do not use the Switch submerged in oil or water, or in locations continuously subject to splashes of oil or water. Doing so may result in oil or water entering the Switch interior. (The IP67 degree of protection specification for the Switch refers to water penetration while the Switch is submerged in water for a specified period of time.)
- Always attach the cover after completing wiring and before using the Switch. Also, do not turn ON the Switch with the cover open. Doing so may result in electric shock.
- Do not switch circuits for two or more standard loads (250 VAC, 3 A). Doing so may adversely affect insulation performance.

Precautions for Correct Use

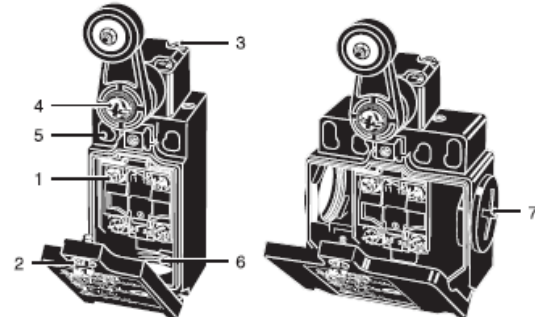
The Switch contacts can be used with either standard loads or microloads. Once the contacts have been used to switch a load, however, they cannot be used to switch smaller loads. The contact surfaces will become rough once they have been used and contact reliability for smaller loads may be reduced.

Mounting Method

Appropriate Tightening Torque

Tighten each of the screws to the specified torque. Loose screws may result in malfunction of the Switch within a short time.

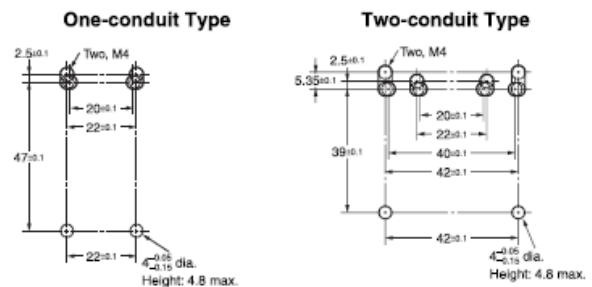
1	Terminal screw	0.6 to 0.8 N·m
2	Cover mounting screw	0.5 to 0.7 N·m
3	Head mounting screw	0.5 to 0.6 N·m
4	Lever mounting screw	1.6 to 1.8 N·m
5	Body mounting screw	0.5 to 0.7 N·m
6	Connector, M12 adaptor	1.8 to 2.2 N·m
7	Cap screw	1.3 to 1.7 N·m



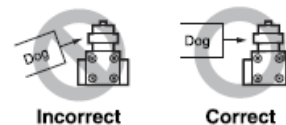
Switch Mounting

- Mount the Switch using M4 screws and spring washers and tighten the screws to the specified torque.
- For safety, use screws that cannot be easily removed, or use an equivalent measure to ensure that the Switch is secure.
- As shown below, two studs with a maximum height of 4.8 mm and a diameter of $4_{-0.05}^{+0.15}$ mm can be provided, the studs inserted into the holes on the bottom of the Switch, and the Switch secured at four locations to increase the mounting strength.

Switch Mounting Holes



- Make sure that the dog contacts the actuator at a right angle. Applying a load to the switch actuator (roller) on a slant may result in deformation or damage of the actuator or rotary shaft.



Incorrect

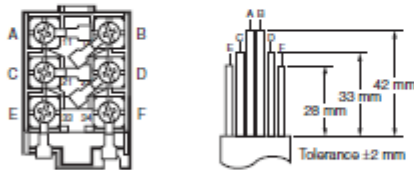
Correct

Wiring

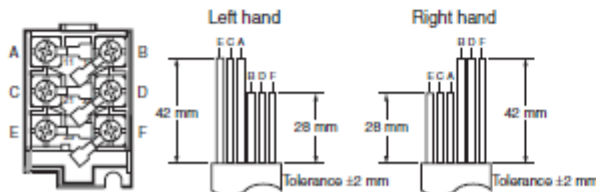
Wiring

- When connecting to the terminals via insulating tube and M3.5 crimp terminals, arrange the crimp terminals as shown below so that they do not rise up onto the case or the cover. Applicable lead wire size: AWG20 to AWG18 (0.5 to 0.75 mm²). Use lead wires of an appropriate length, as shown below. Not doing so may result in excess length causing the cover to rise and not fit properly.

One-conduit Type (3 Poles)



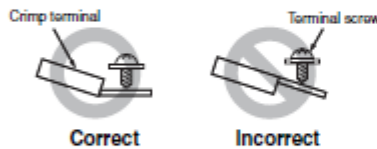
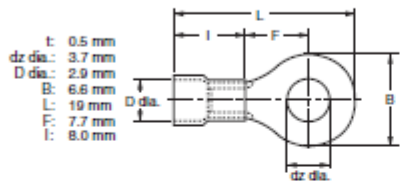
Two-conduit Type (3 Poles)



- Do not push crimp terminals into gaps in the case interior. Doing so may cause damage or deformation of the case.
- Use crimp terminals not more than 0.5 mm in thickness. Otherwise, they will interfere with other components inside the case.

[Reference] The crimp terminals shown below are not more than 0.5 mm thick.

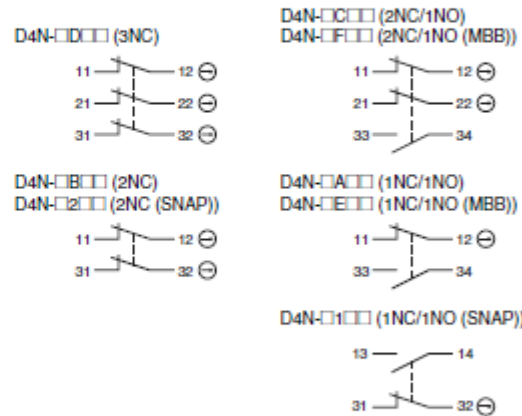
Manufacturer	Type
J.S.T. Mfg. Co.	FN0.5-3.7 (F Type)
	N0.5-3.7 (Straight Type)



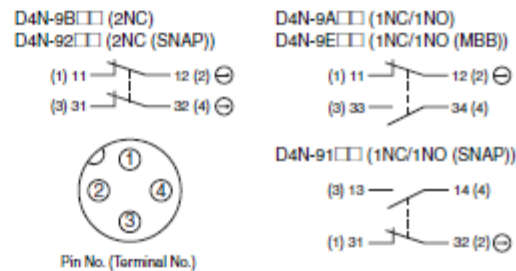
Contact Arrangement

- The contact arrangements are shown below.

Screw Terminal Type



Connector Type



- Applicable socket: XS2F-D421 series (OMRON).
- Refer to the *Connector Catalog* for details on socket pin numbers and lead wire colors.

Socket Tightening (Connector Type)

- Turn the socket connector screws by hand and tighten until no space remains between the socket and the plug.
- Make sure that the socket connector is tightened securely. Otherwise, the rated degree of protection (IP67) may not be maintained and vibration may loosen the socket connector.

Conduit Opening

- Connect a recommended connector to the opening of the conduit and tighten the connector to the specified torque. The case may be damaged if an excessive tightening torque is applied.
- Use a cable with a suitable diameter for the connector.
- Attach and tighten a conduit cap to the unused conduit opening when wiring. Tighten the conduit cap to the specified torque. The conduit cap is provided with the Switch (2-conduit types).

Changing the Lever

The lever mounting screws can be used to set the lever position to any position in a 360° angle at 7.5° increments. Grooves are incised on the lever and rotary shaft that engage to prevent the lever from slipping against the rotary shaft. The screws on adjustable roller lever models can also be loosened to change the length of the lever. Remove the screws from the front of the lever before mounting the lever in reverse (front/back), and set the level so that operation will be completed before exceeding a range of 180° on the horizontal.

Recommended Connectors

Use connectors with screws not exceeding 9 mm, otherwise the screws will protrude into the case interior, interfering with other components in the case.

The connectors listed in the following table have connectors with thread sections not exceeding 9 mm.

Use the recommended connectors to ensure conformance to IP67.

Size	Manufacturer	Model	Applicable cable diameter
G1/2	LAPP	ST-PF1/2 5380-1002	6.0 to 12.0 mm
Pg13.5	LAPP	ST-13.5 5301-5030	6.0 to 12.0 mm
M20	LAPP	ST-M20 × 1.5 5311-1020	7.0 to 13.0 mm

Use LAPP connectors together with seal packing (JPK-16, GP-13.5, or GPM20), and tighten to the specified tightening torque. Seal packing is sold separately.

- LAPP is a German manufacturer.

Others

- When attaching a cover, be sure that the seal rubber is in place and that there is no foreign material present. If the cover is attached with the seal rubber out of place or if foreign material is stuck to the rubber, a proper seal will not be obtained.
- Do not use any screws to connect the cover other than the specified ones. The seal characteristics may be reduced.
- Make sure that foreign particles do not enter the head when removing the screws from the four corners to change the head position in any of the four directions.
- Use the following recommended countermeasures to prevent telegraphing when using adjustable or long levers.
 1. Make the rear edge of the dog smooth with an angle of 15° to 30° or make it in the shape of a quadratic curve.
 2. Design the circuit so that no error signal will be generated.

► Read and follow these safety instructions first and take notice of the operating instructions.

Safety instructions

1. The installation, initial operation and maintenance may be done by a qualified expert with electrical know-how only.
2. Comply with the local and statutory rules and regulations and/or the VDE 0100.
3. Take notice of the temperature specifications at the data plate.
4. A fuse (with max. 4A) has to be connected in series to the voltage supply.
5. Protect the signal contact from voltage peaks when inductive loads are connected.
6. The device may put into operation if it is closed, only.
7. Switch off the power supply, before opening the device. (touchdangerous voltage)

Operating instructions

1. Description

1.1 Intended use

The level indicator observes the filling level as a limit switch in silos and vessels. It can be used as full, demand and empty indicator for dusty and powdery, granulated and grainy bulk goods with a max. grain size up to 30 mm and with a bulk density of 0.3 t/m³ ... 2.5 t/m³.

1.2 Function

The bulk goods presses with its weight against the membrane. A tappet directly transfers the pressure from the membrane to the switch. When the bulk goods are decreasing, pressure is taken off the membrane and the switch will be interconnected.

1.3 Technical data

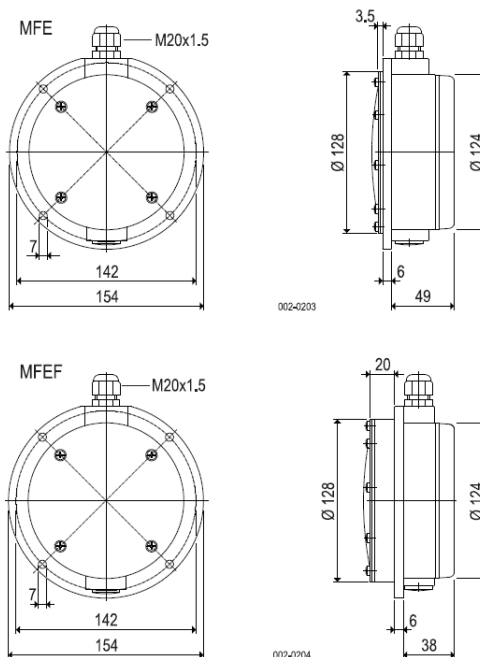
Manufacturer	MOLLET Füllstandtechnik GmbH
Address	Industriepark RIO 103 74706 Osterburken
Name	Membrane level indicator
Type	MFE (GFK) and MFE-A (Alu) MFEF (GFK) and MFEF-A (Alu)
Temperature range	GFK Aluminium -20 °C ... +60 °C -25 °C ... +80 °C
Signal contact	change-over contact, potentialfree
Capacity of the contact	Contact 4 A / 250 V AC
Switching voltage	24 V ... 250 V AC or 12 V ... 125 V DC
Response delay	none
Cable connection	Screw M4
Cable entry	Cable gland M20x1,5
Type of protection acc. to DIN EN 60529	IP40 IP53 if cable gland is upwards IP65 with stainless steel membrane IP66 with aluminium housing
Overpressure safety	up to 1 bar
Weight	MFE 0.48 kg MFE-A 0.95 kg MFEF 0.49 kg MFEF-A 1.00 kg
Maintenance	none
Mounting position	any position

1.4 Materials

Type	Housing
MFE(F)-. .	= GFK (glass-fibre reinforced plastics)
MFE(F)-A . .	= Aluminium

Type	Membrane	Mounting ring
MFE(F)-. NN	= NBR	Steel, galvanized
MFE(F)-. VN	= VITON	Steel, galvanized
MFE(F)-. NE	= NBR	Stainless steel 1.4301 / 304
MFE(F)-. VE	= VITON	Stainless steel 1.4301 / 304
MFE(F)-. EE	= 304	Stainless steel 1.4301 / 304

1.5 Dimensions



2. Installation

2.1 Preparation

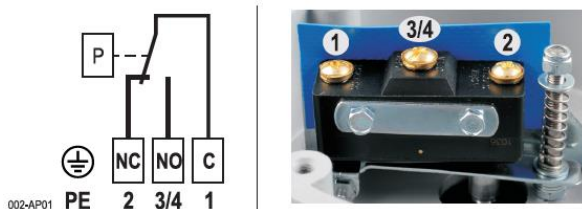
- Check the membrane of visual transport damage.
- Read and follow the safety instructions and the operating instructions, before handling with the device !

2.2 Mounting in the vessel

Position the level indicator with the gasket at the provided flange and fix it with 4 washers and screws M6.

2.3 Electrical connection

Circuit diagram



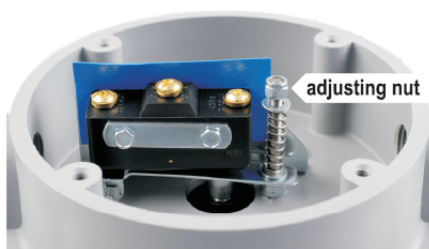
2.4 Cable gland

- After electrical connection, tighten the cable gland.
- Screw the cap nut, until the cable entry is closed tightly.

3. Commissioning

- Put the level indicator into operation only, if the installation and the electrical connection have been done correctly.
- The level indicator is presetted at sensitive.
- With the adjusting nut the device can be adjustable insensitive. Clockwise insensitive.
- **Sensitivities** with membrane:

NBR	60 g ... 1000 g
VITON	60 g ... 1000 g
Stainless steel 1.4301 / 304	150 g ... 2000 g



4. Utilization

4.1 Normal operation

- Use the level indicator in its intended application only.
- The level indicator is provided for use in silos or vessels with pressureless operation.
- Comply with the specifications on the data plate. Check the membrane of the level indicator, when the permissible temperature of bulk goods was exceeded or was fallen short off.
- Damaged devices have to put out of operation immediately.

4.2 Inexpert handling

- Ignoring of the safety instructions and the operating instructions.
- Not intended use.
- Mounting of spare parts which are no original parts.
- Violation against applicable law and standards.

5. Maintenance and servicing

5.1 General informations

- Do maintenance work only, if the silo or the vessel is empty and if there is no overpressure or vacuum.
- Use original spare parts only.

5.2 Maintenance

- Inspect in regular intervals if there is any wear or abrasion at the membrane. Define the control intervals, depending on the characteristics of the bulk goods.
- In case of damage or abrasion, replace the membrane immediately with a new membrane.

5.3 Servicing

- Damaged parts have immediately replaced with similar.
- Until the complete reconstruction of the proper function, the level indicator must not be used any more.

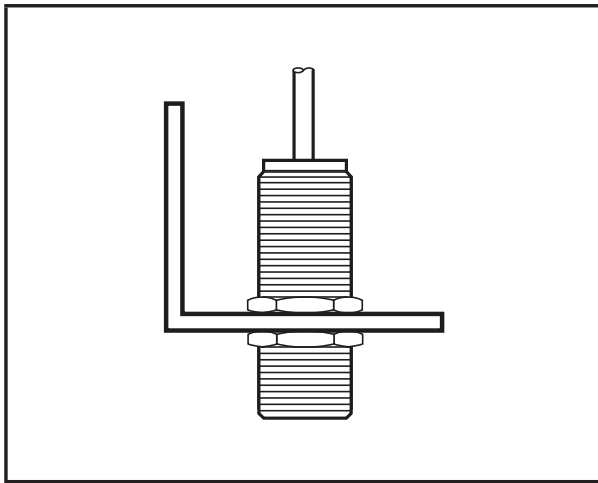
6. Storage

- Store the level indicator dry and dust-free.
- Protect the membrane against pointed objects and ultraviolet radiation.

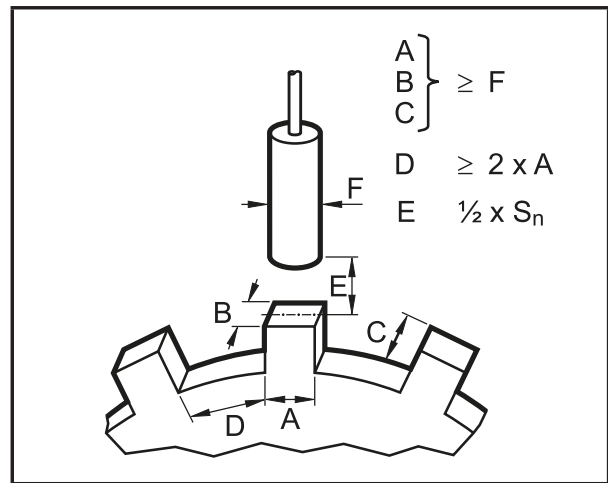
7. Disposal

- The level indicator can be recycled.
- The disposal applies to the valid environmental guidelines according to the location of the carrier and the local manufacturing conditions.

4 Installation



Mounting principle

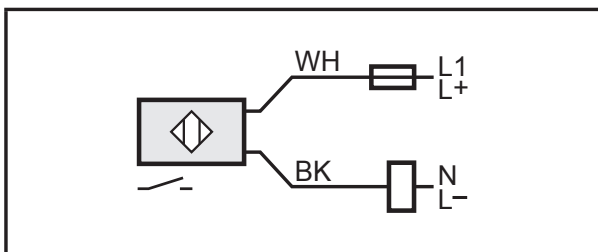


Mounting specifications

UK

- ▶ Fix the unit by means of a mounting device and secure it by means of the nuts provided so that it cannot work loose.
Flush installation.
- ▶ Adhere to the above mounting specifications to ensure a correct function.
Nominal sensing range S_n (→ 8 Technical data)

5 Electrical connection

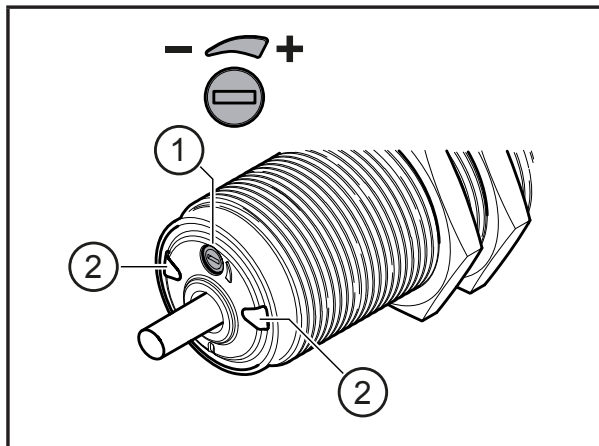


BK = black
WH = white

Wiring

- ▶ Disconnect power.
 - ▶ Connect the device according to the wiring arrangement.
- !** Miniature fuse to IEC60127-2 sheet 1, ≤ 2 A (fast acting)
ATEX units (DI1xxA):
Place the fuse outside the hazardous area.

6 Setting



- 1: Multi-turn potentiometer for switch point setting (without end stop)
- 2: LEDs for switching status indication (→ 3.1 Switching function)

Operating and display elements

- ▶ Keep the minimum speed to be monitored in the plant on a constant level.
- ▶ Switch on the device.
- ▶ Wait until the start-up delay is over (→ 8 Technical data).
- ▶ Set the switch point depending on the status of the LEDs.

If the LEDs are not lit:

- Turn the pot slowly anticlockwise (-) until the LEDs are lit.
Setting is finished.

If the LEDs are lit:

- Turn the pot clockwise (+) until the LEDs go off.
- Turn the pot slowly anticlockwise (-) until the LEDs are lit.
Setting is finished.

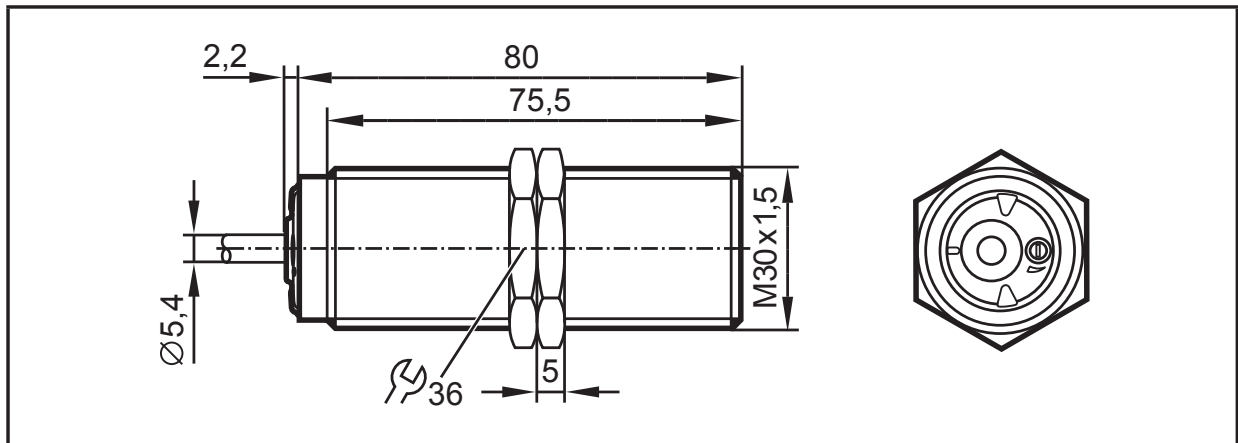
7 Operation

The operation is maintenance-free.

Ensure the following for a correct function:

- ▶ Keep the sensing face and the open space free of metal deposits and foreign bodies.
- ▶ Do not operate units with high field intensity (e.g. mobile phones) at close range to the speed monitor.

8 Technical data



UK

Dimensions [mm]

		DI0101	DI0104	DI103A
Nominal voltage	[V]	20...250 AC/DC (45...65 Hz, AC)		
Current rating (continuous)	[mA]	350 AC, 50 °C 250 AC, 80 °C 100 DC, 80 °C		200 AC, 60 °C 100 DC, 60 °C
Current rating (peak)	[mA]	2200 (20 ms / 0.5 Hz)		
Minimum load current	[mA]	> 6		
Leakage current	[mA]	< 1.5		
Voltage drop	[V]	< 7.5		
Reverse polarity protection		yes		
Short circuit / overload protection		no / no		
Nominal sensing range (Sn)	[mm]	10		
Operating distance (Sa)	[mm]	0...8.1		
Setting range	[pulses/min]	5...3600		
Hysteresis	[% of SP]	10		
Start-up delay	[s]	12	< 0.5	12
Damping frequency	[pulses/min]	≤ 4800 (for Sn/2)		
Ambient temperature	[°C]	-25...80		-20...60
Protection		IP 65 / IP 67 / II		
ATEX equipment category		-		3D
Connection		PUR cable / 2 m; 2 x 0.5 mm ²		

Data sheets and EC declarations of conformity can be found at:
www.ifm.com → Data sheet search → Article number



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