



SOBY.COM
TRUSTED SINCE 1961



User manual

SR60-175

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 Instructions



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

If the buyer makes technical modifications to the machine, any warranty from SØBY is cancelled. The declaration then loses its validity.

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

- The unit may only be used as described in this manual. Replacing parts or changing the construction of the unit may require the equipment to be recertified.
- Assembly, commissioning and operation only by using this User Manual.
- Documentable compliance with maintenance intervals according to instructions.
- Only use the original spare parts of the manufacturer.
- Operation of the chain conveyor only with motor protection or star Delta connection with motor protection.
- All joints must be sealed by silicone to avoid dust emissions or water ingress.
- Emergency stop must be installed according to current standard EN 60204-1.
- By normal operation of the machine, see pictogram devices and read user / assembly instructions.
- When working 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 entails a special responsibility for the persons performing the work. The work in question requires that assembly and maintenance personnel have a thorough knowledge of the laws, rules and standards within the area. This construction provides a brief overview of the key safety issues associated with the installation, maintenance and use of the equipment. Attention is drawn to the fact that it is the end user's responsibility to identify any potentially hazardous areas in accordance with applicable regulations, with the following requirements for zone classification and any reporting to local authorities.
- Repair, service and maintenance must be done in strict accordance with the instructions of SØBY and must be carried out by personnel who possess the necessary qualifications in relation to the performance of the equipment's explosion safety. Inspection and maintenance concerning the electrical equipment should be based on the instructions in EN60079-17.

- During the life time of the chain conveyor and in connection with use, please pay special attention to the following:
 - Life times (see diagram)
 - Damages to parts and screens
 - Corrosion
 - After tensioning of bolts and screws
 - Data and information about permissible installation and operating conditions on the equipment's rating plate
 - Instructions on possible type of certificate for equipment mounted on the unit

- Modifications or alterations to the equipment that affect the equipment's explosion safety are not permitted. Before using the equipment, please check that it is undamaged, assembled and installed as directed by SØBY.

The manufacturer reserves the right to make technical changes.

The machine can be used for the transport of feedstuff, which causes an internal ATEX zone 22. In case the machine is installed in zone 21 or 22, suitable gear and motor must be selected for this.

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

	Particle size [μm]	Ignition temperature Dust cloud [$^{\circ}\text{C}$]	Ignition temperature 5 mm Dust layer [$^{\circ}\text{C}$]	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 stones or metal parts, the explosion safety of the equipment cannot be guaranteed.

Must comply with EN60079-10:2015 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 installations 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 mounted before the machine is put into operation.

The motor must be properly protected with overload protection equipment, and the chain conveyor must be properly secured appropriate potential equalization.

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

Intermediate outlet must start automatically. Beware of fingers and limbs. Intermediate outlet must be connected to lockable main switch.

When the chain conveyor is running, do not insert your hand or fingers into the drive device or elsewhere.

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

Shields such as inlet covers to prevent or remove risks must be maintained on a regular basis.

The machine must be installed so that there are ergonomic good conditions for servicing the machine.

The safety equipment, which has been removed during repair, cleaning or maintenance, must be re-established before using the installation again.

All screws, bolts and attachments must be properly tightened.

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

The chain conveyor may 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 to the installation and breach of the instructions given in this manual.

If the chain conveyor is placed in areas classified as potentially explosive, specially approved motor and gear box 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 in which the equipment is installed, remains within the allowed limit values of the equipment $-20^{\circ}\text{C} \leq \text{TA} \leq 40^{\circ}$. Therefore, when installing the unit, it is necessary to consider any possible external heat sources that might 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.

Respiratory masks, safety shoes, hearing protection and other required safety precautions that might be required by the local workplace assessment, must be used during any kind of work with the machine, where the chain conveyor is installed. Furthermore, a helmet must be used during installation, service and assembly/disassembly.

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

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

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

Please note that if the chain conveyor is expected to run empty for more than 5 minutes, it is necessary to install a dry-running sensor to ensure that the machine stops; likewise, it is also ensure that the machine outlet is not clogged. Chain conveyors SR60-175 are as standard installed with an overflow sensor on the drive and tension section.

Use of the machine

The chain conveyor is designed to convey of grain and almost all seed 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 powered by a gearmotor. It moves the conveying material from an inlet to an outlet.

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

The chain conveyor can have a speed of:

SR60: 0,47-0,81 m/s
SR80: 0,57-1,15 m/s

SR100: 0,47-0,80 m/s
SR120: 0,57-1,10 m/s

SR150-175: 0,55 m/s

The chain conveyor **may not** be used for tasks beyond what is described in this manual.

Explanation of the Pictograms



Prior to repair, maintenance and cleaning, turn off the motor and unplug the power cord. Hearing protection is mandatory .
Moving machine parts can be dangerous.
They are only to be touched when they are completely at ease.
All shielding must be installed before the machine is started.

Specifications

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

SR60 Chain conveyor = 60 t/hour

SR80 Chain conveyor = 80 t/hour

SR100 Chain conveyor = 100 t/hour

SR120 Chain conveyor = 120 t/hour

SR150 Chain conveyor = 150 t/hour

SR175 Chain conveyor = 175 t/hour

Construction of Module

Chain conveyors type SR60-175 are constructed in modules, so that the desired lengths always can be achieved 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 the spot either by manually operated outlets or by outlet for remote control. Operation then takes place via wire from an accessible location. Can also be automatically/electrically operated.

Ascending conveying

Chain conveyors can be used for slightly ascending conveying up to 7 ° without using extended flights and intermediate plate.

At inclining conveying (SR60-120) 10 ° -30 °, extensions with intermediate plate and chain with extended flights are used. The same applies for chain conveyors for pit mounted with bend.

Reversible chain conveyors

In many cases it may be appropriate that the chain conveyor can convey in both directions, i.e. that the inlet is in the middle of the chain conveyor and this conveys to one side or the other, respectively. In the case of conveyors below 20m, this can be done just by installing a polarity reverser in the electrical connection, and by installing an outlet section just before the tail section. In these cases, please note that the chain must be kept tighter than usual, as a slack chain can cause damage to the conveyor.

Pipework

For the chain conveyors, all types of piping can be supplied to inlet and from outlet.

For SR60-80 in- and outlet are Ø250, also available with Q24.

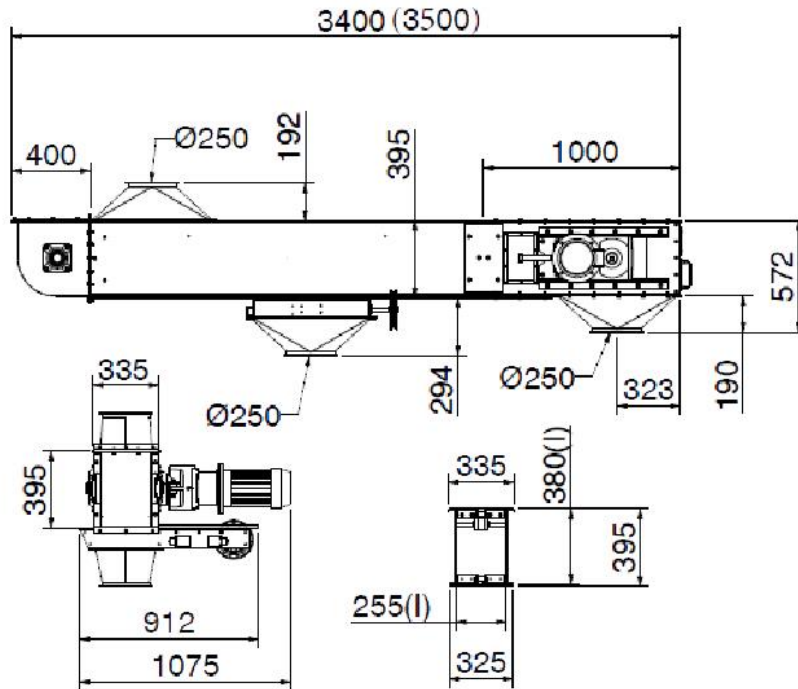
For SR100-175 in- and outlet are Ø300, also available with Q30.

Pipes require 45 ° fall in order to enable grain and the like to slide. When working with seeds and other hard flowing products, the angle of sliding is somewhat larger.

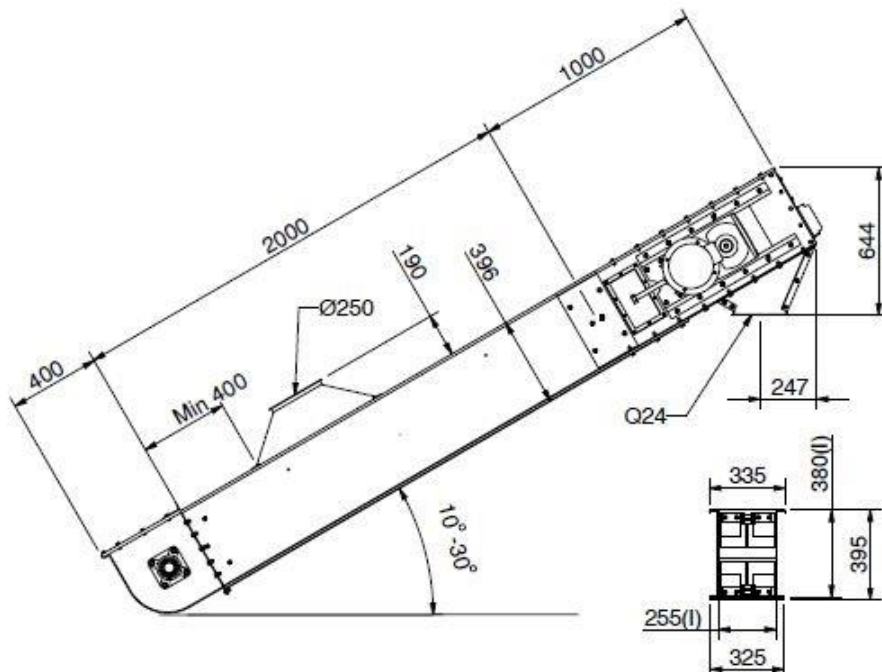
Technical data

Noise level: Operation with grain 78 dB(A)
 Without grain 68 dB(A)

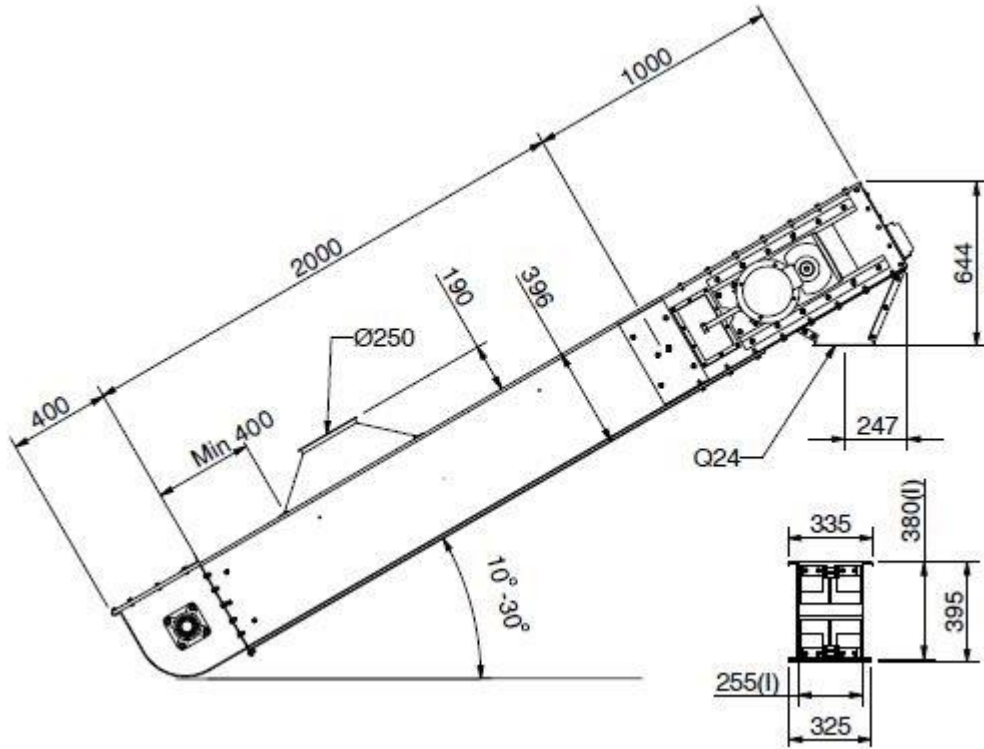
SR60-80



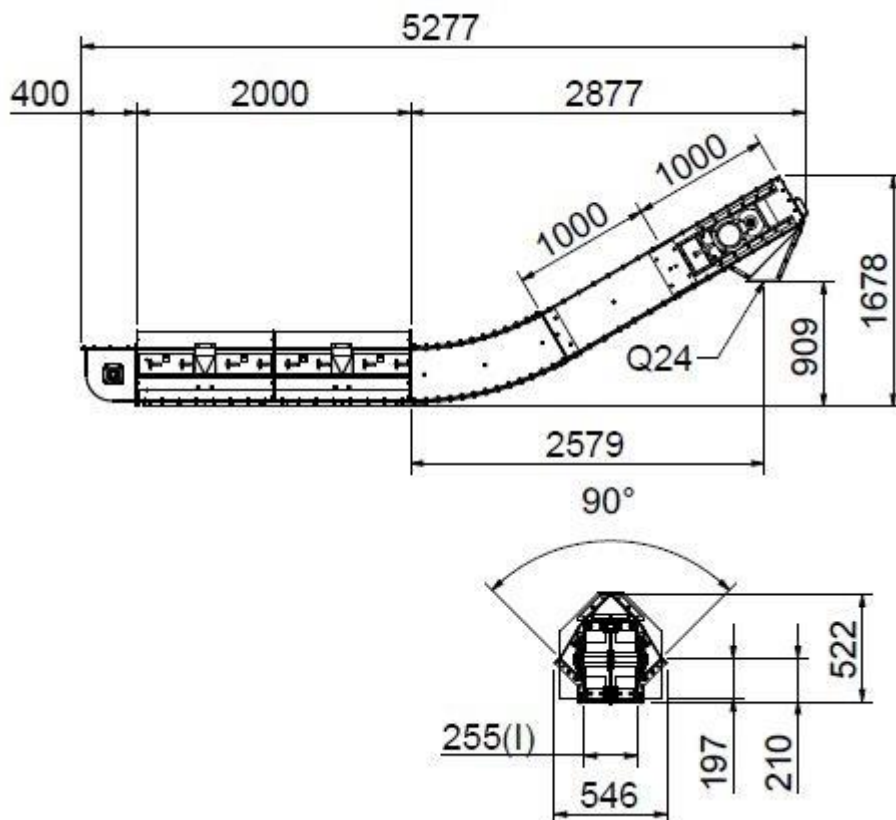
SR60-80 inclined (10°-30°)



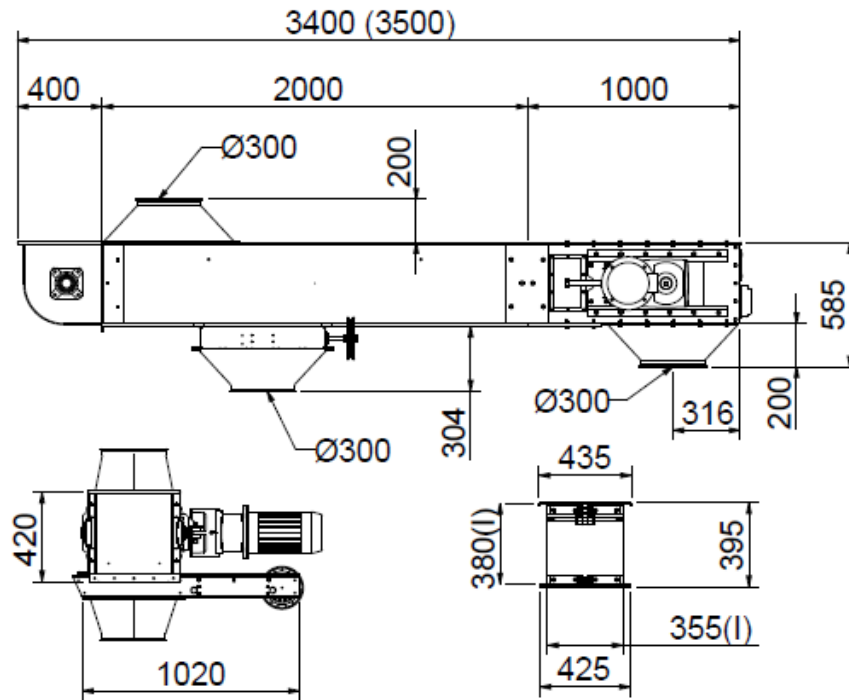
SR60-80 pit



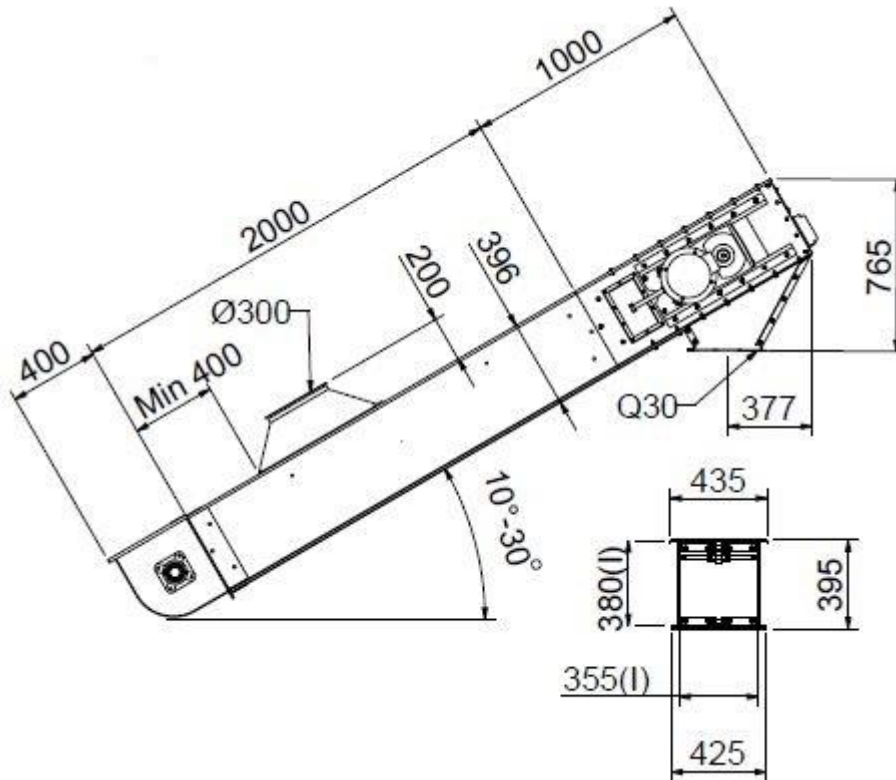
SR60-80 for pit with bend (30°-45°)



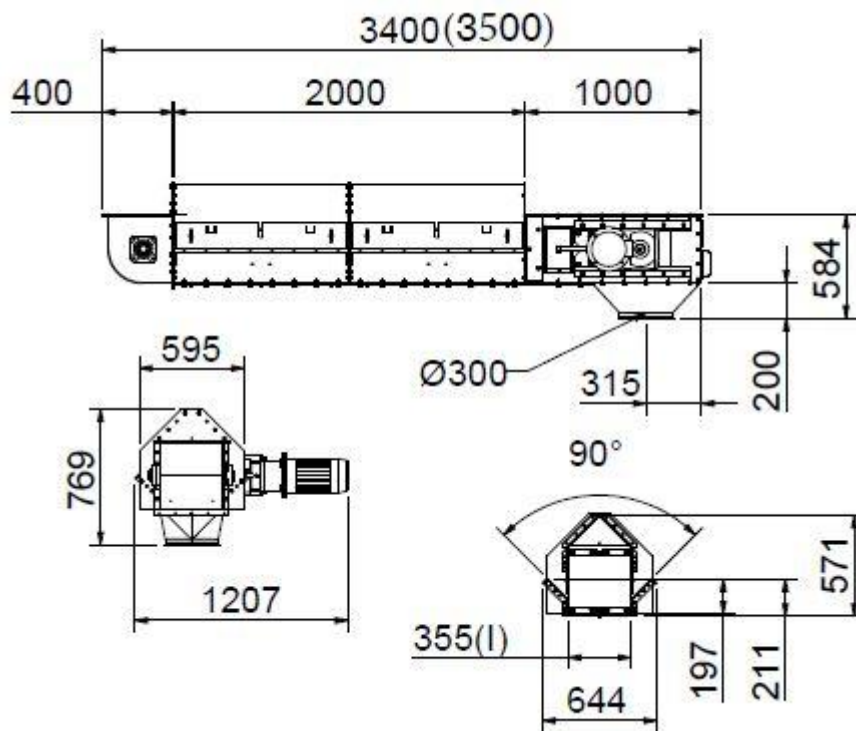
SR100-120



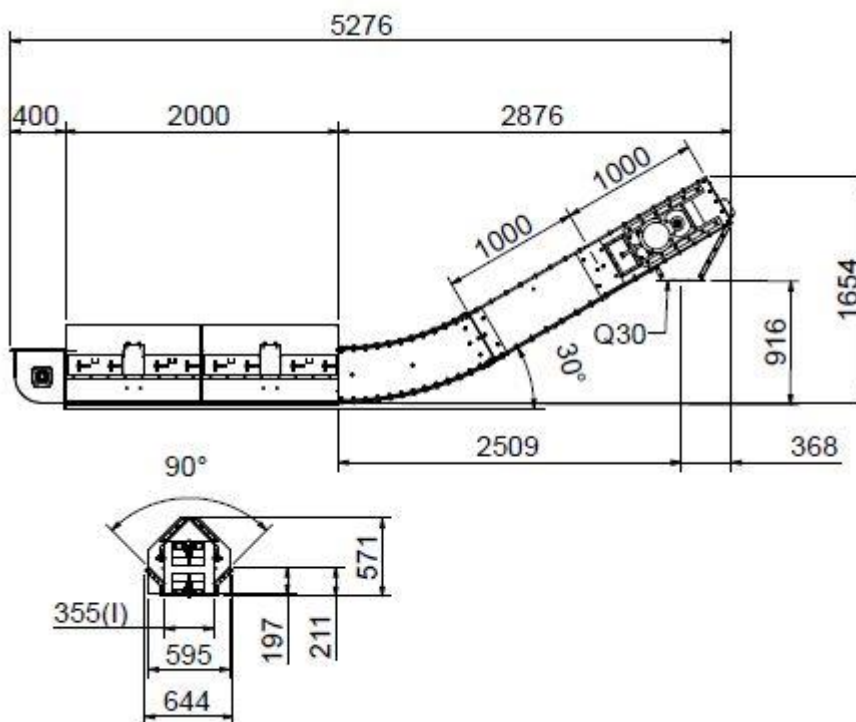
SR100-120 Inclined (10°-30°)



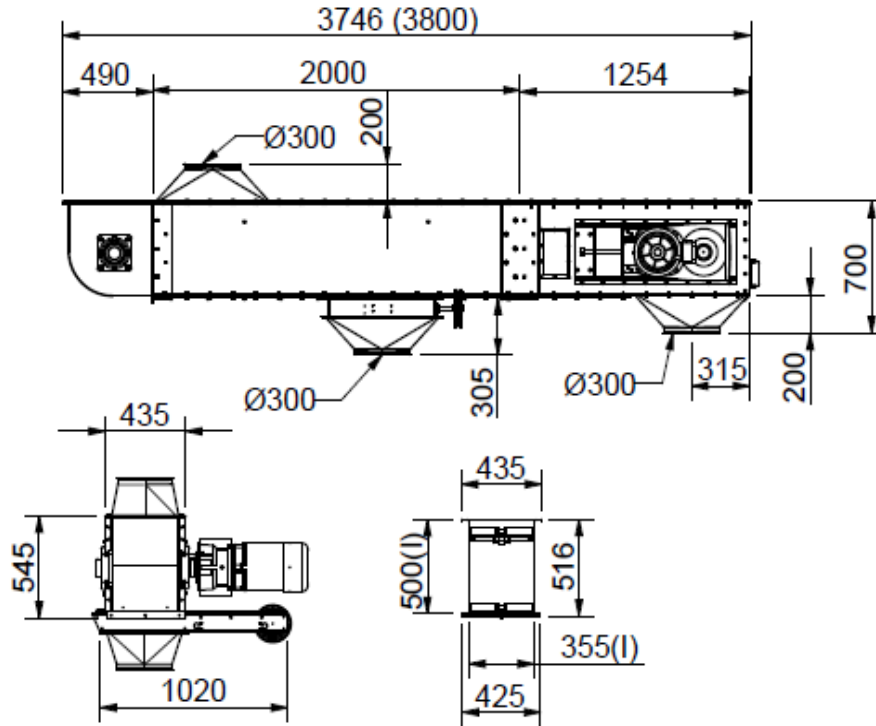
SR100-120 pit



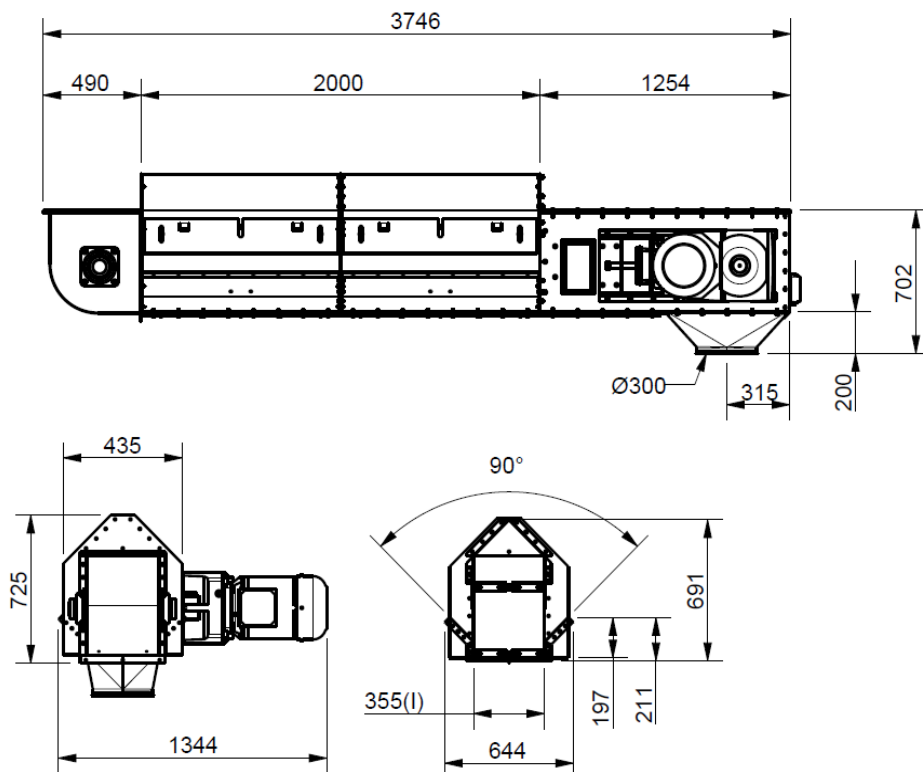
SR100-120 for pit with bend (30°-45°)



SR150-175

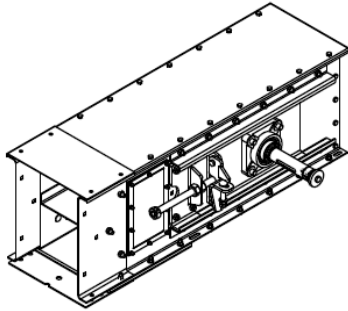


SR150-175 pit

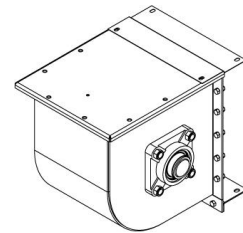


Description of components

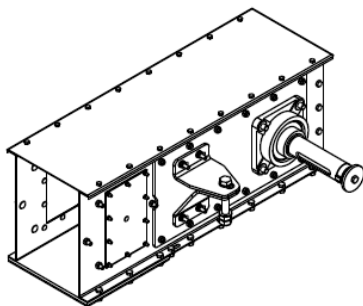
Drive-tension section for gearmotor



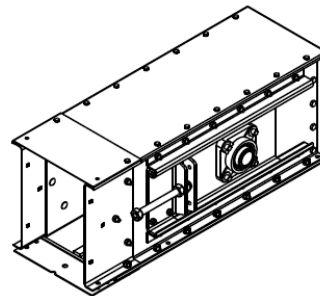
Tail section



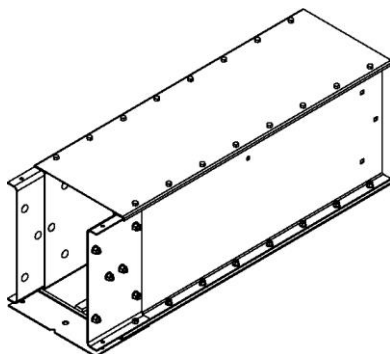
Drive section for gearmotor



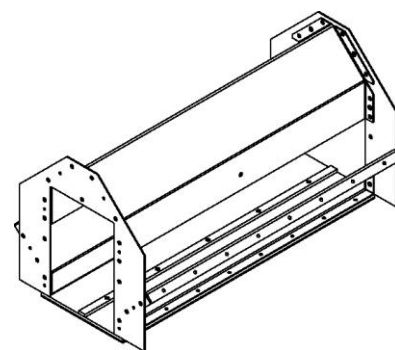
Tension section



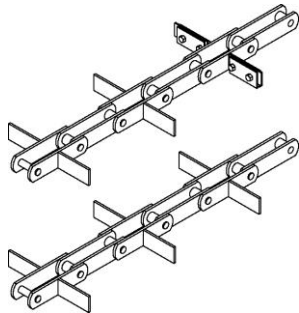
Extension without chain



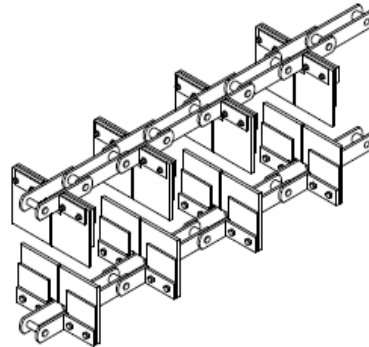
Extension with side inlet without chain



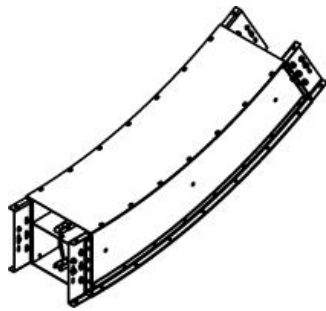
Chain for straight chain conveyor



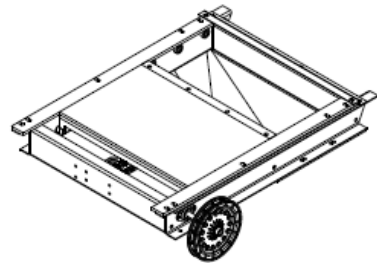
Chain with extended carriers



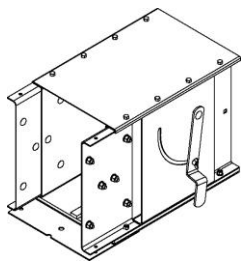
Extension as bend



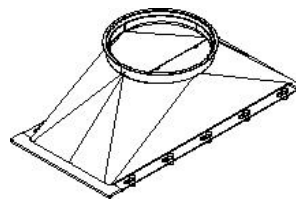
Intermediate outlet



Flow regulator without chain



In -/ outlet Ø250/Ø300



Installation of SR60-175

The installation of chain conveyors, as referred to in this section, is a guideline from SØBY. If this is followed, a safe and uniform assembly of the chain conveyor is ensured.

The machine can also be assembled in other ways.

Installation of the chain conveyor may only be carried out by specially instructed staff.

The SR60-175 chain conveyor is supplied in separate parts. Before the installation is started, make sure that all parts are complete and delivered according to the order.

The assembly order of the drive-tension section, extensions and outlet sections is planned.

Once the assembly order is determined, dismantle all the covers for the extension sections and remove outlet sections and assembly components.

The chain conveyor must be supported for every 6 m.

If the chain conveyor is going to be mounted at the top of a building, the supports can possibly be designed as hangers hanging down from the rafters or the conveyor can be laid directly on the beams of the roof structure.

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

Standard extensions are bolted together with the assembly plate at the side and in the bottom (see figure 1)

At the tail section and at the extensions with side inlet, angle brackets are mounted instead of plates (see figure 2-1 and figure 2-2).

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

Figure 1

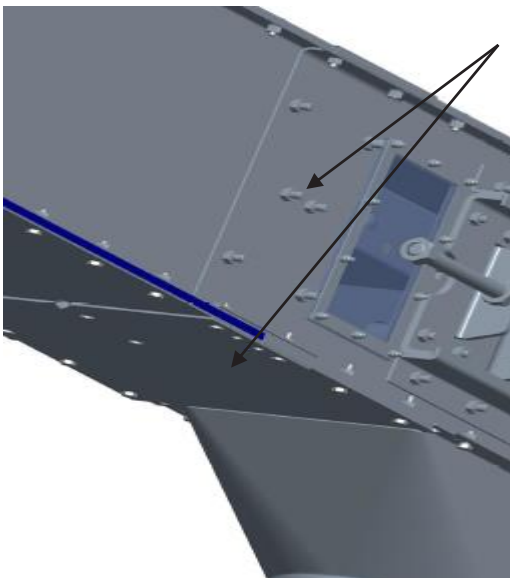


Figure 2-1

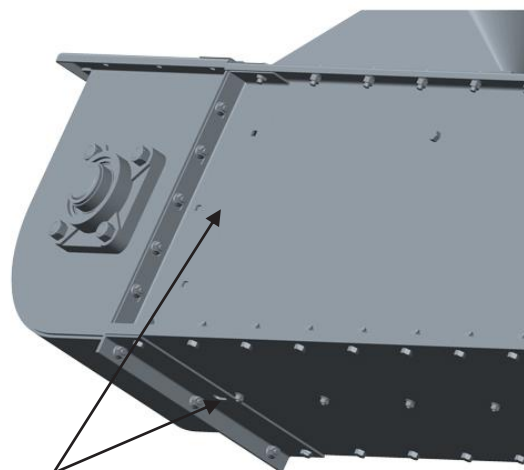
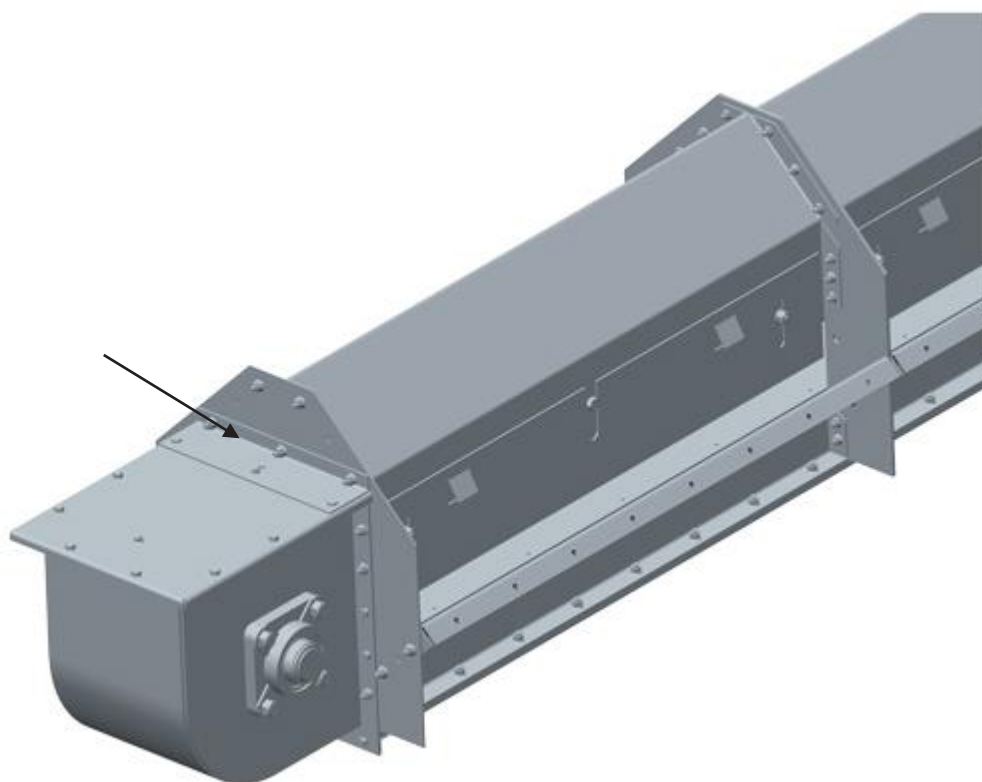


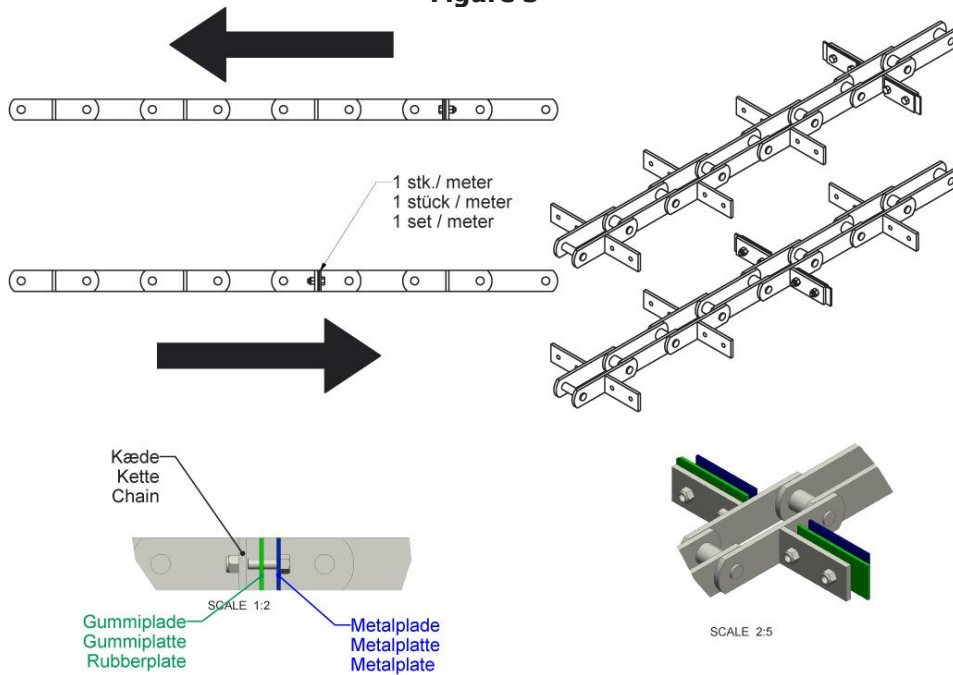
Fig. 2-2



When the sections have been assembled and put into place, the chain is put in and pulled around the chain wheels at the ends.

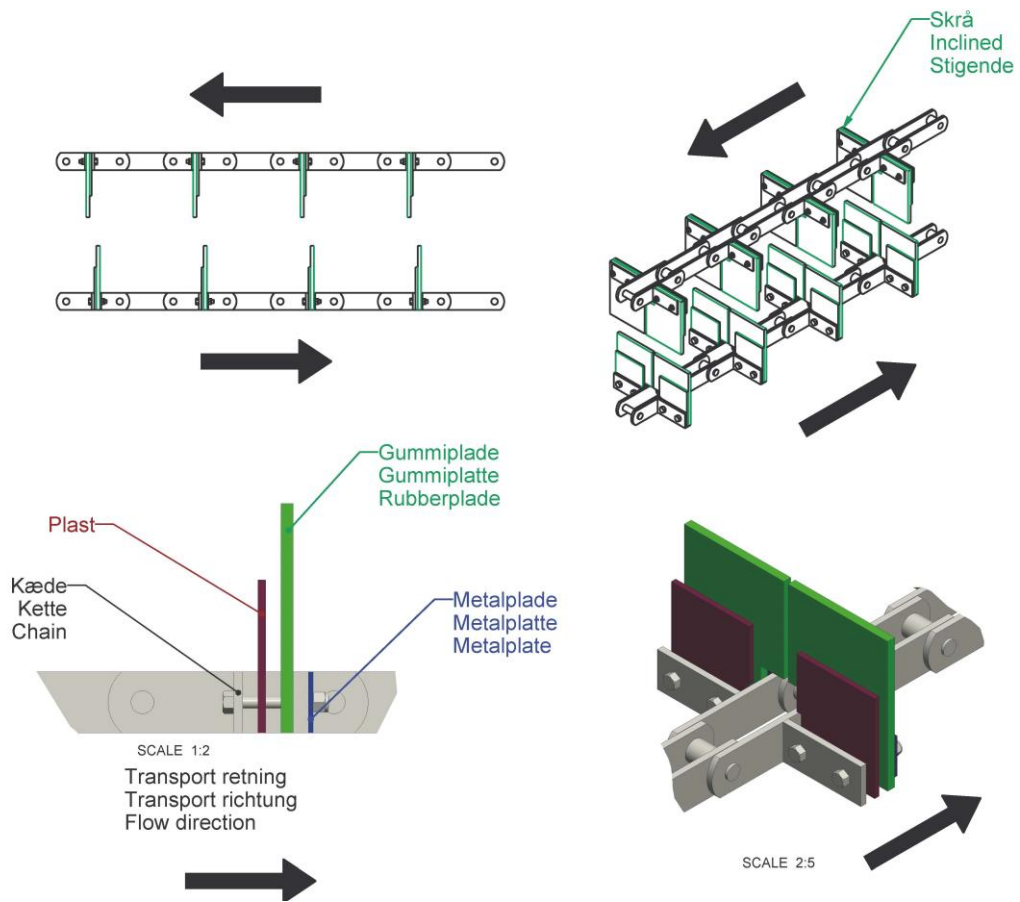
Chain is assembled with included chain assemblies, and cleaning belt is mounted on carrier, which is mounted 1 set for each meter (see figure 3)

Figure 3



NB! For inclining chain conveyors (10°-30°) and pit conveyors with bend, extended carriers and rubber carriers are used on all carriers (see figure 4)

Fig. 4

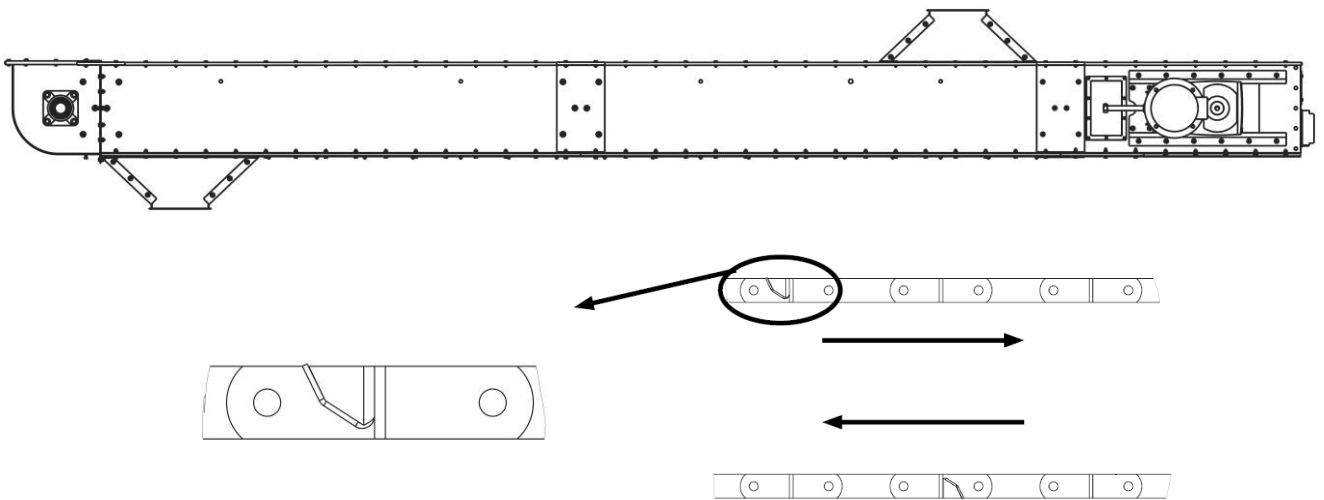


Assembly of return buckets:

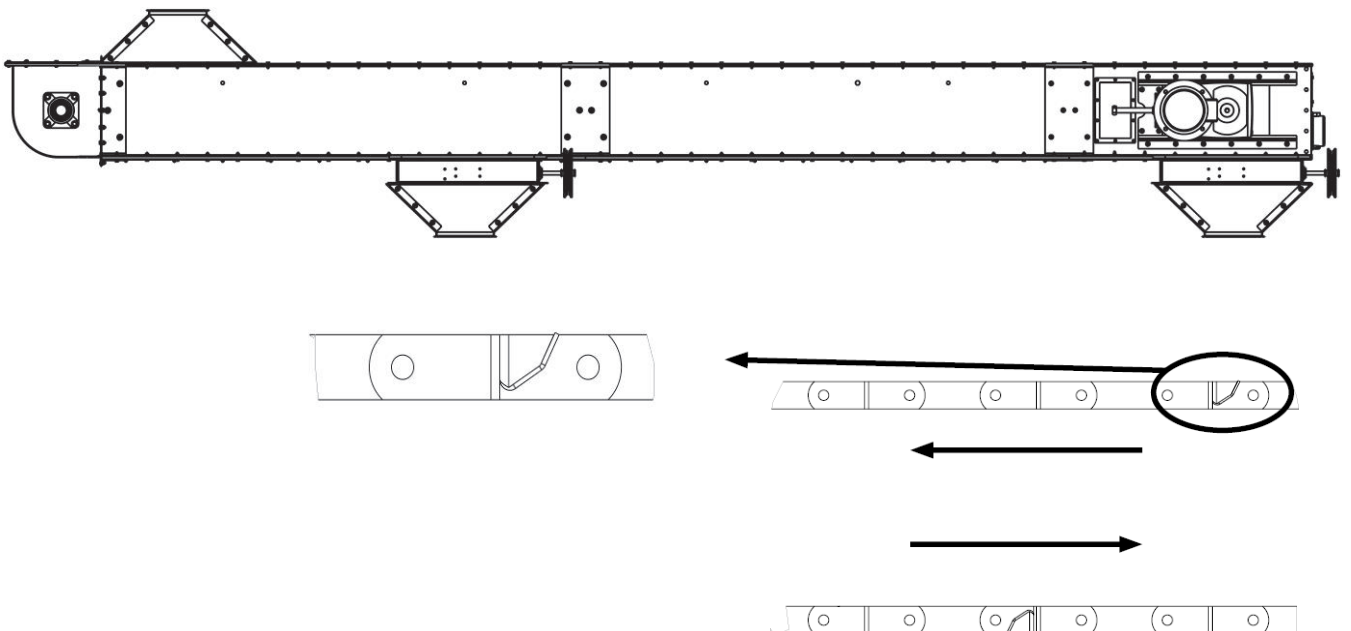
Below is a description of when it is necessary to mount return buckets and when it is not necessary.

When return buckets are mounted, normally one bucket per 4 m chain is mounted.

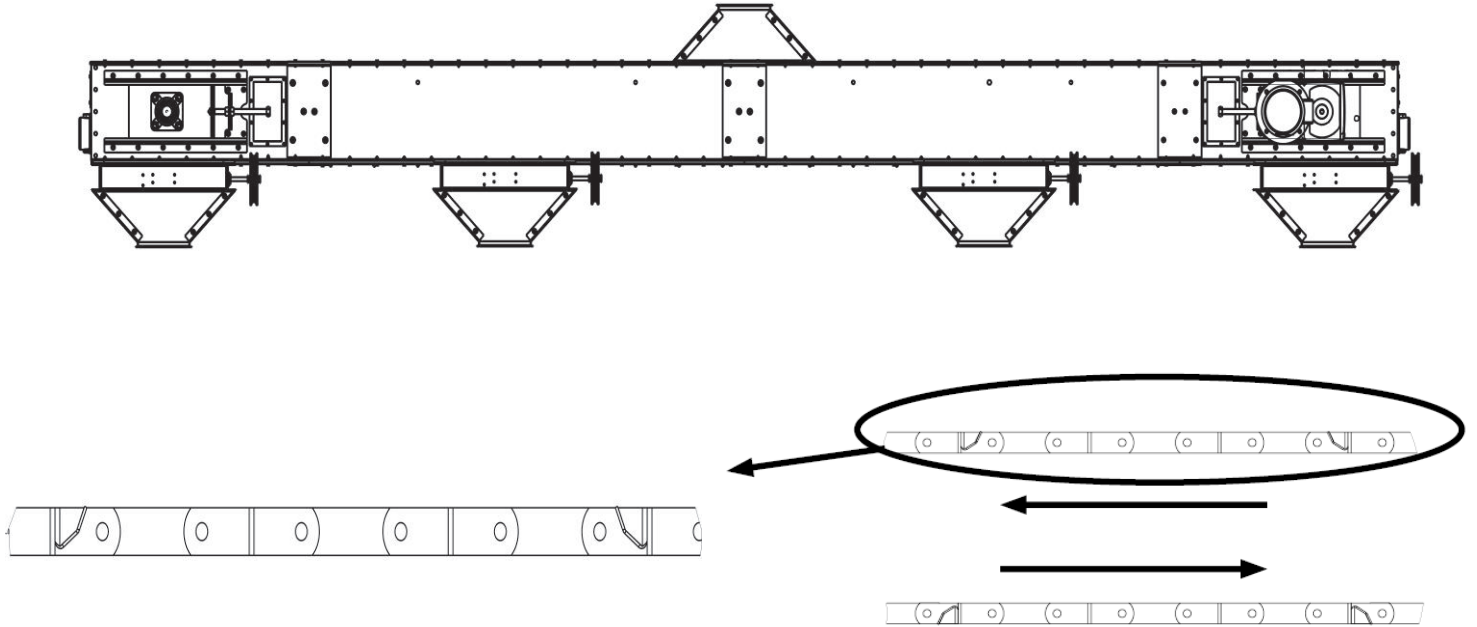
Standard chain conveyor with reverse direction of conveying. Mounted with return buckets.



Chain conveyor with intermediate outlet, and with intermediate outlet under the drive-tension section.
Mounted with return buckets



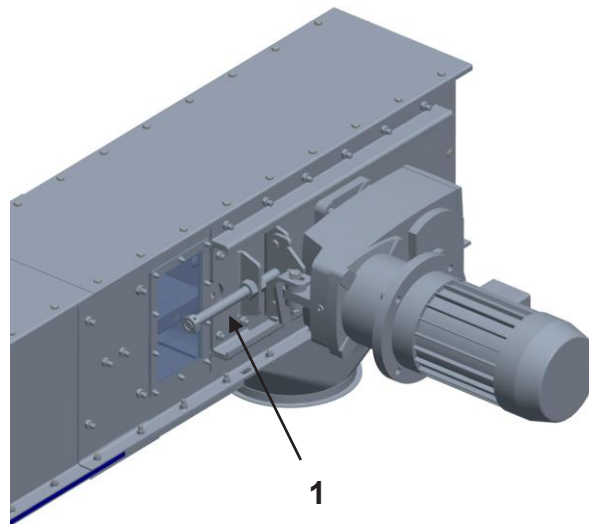
Chain conveyor reversible with intermediate outlet at both drive-tension sections and with extensions.
Mounted with return buckets.



With gearmotor

The chain tensioning bolts are loosened complete and the chain is tensioned with a tackle or with a clamp, and the chain is assembled with the supplied connectors. The chain is then adjusted with the tensioning bolts (figure 5 position 1).

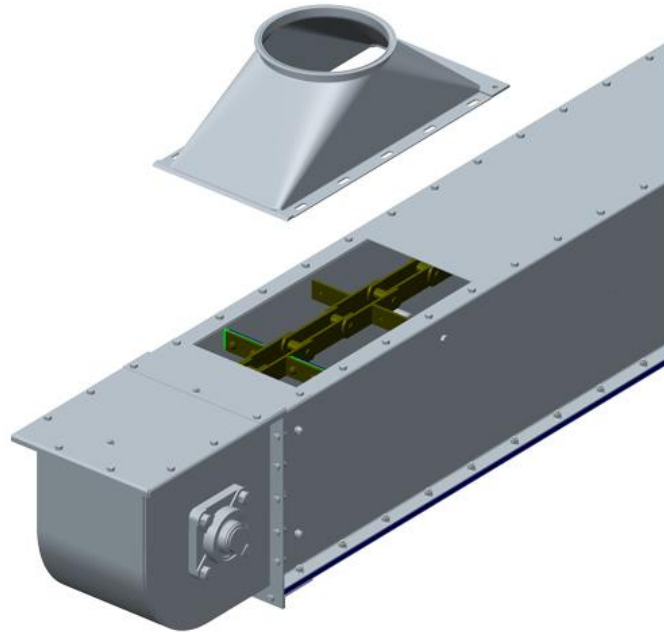
Figure 5



If the chain conveyor is to be placed outside, it is recommended that the electric motors are protected from moisture; for this purpose, rain covers can be supplied.

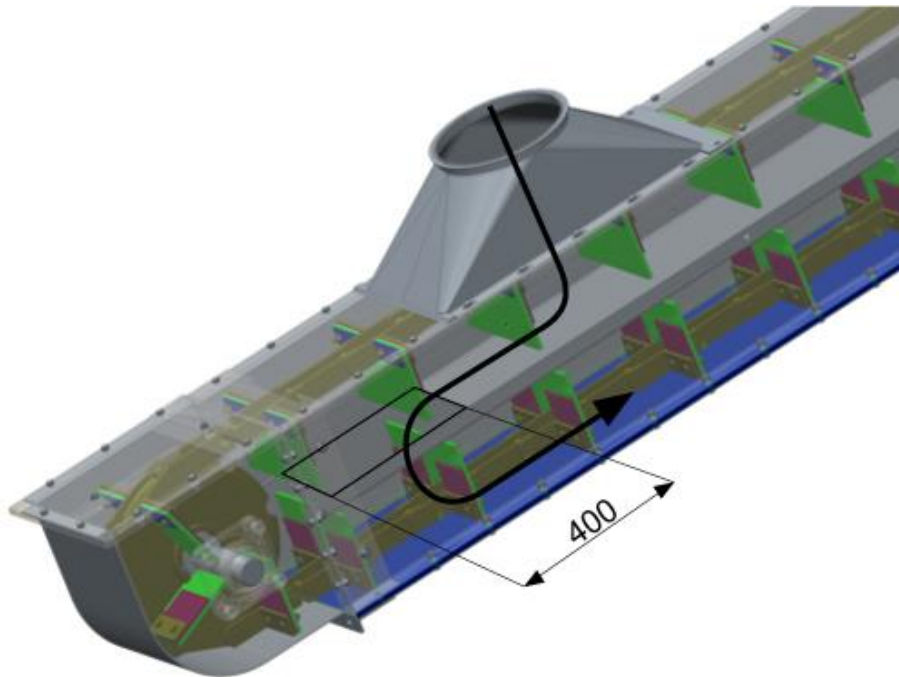
The covers for the extension sections and the outlet sections are mounted.
On the places where the inlets are to be positioned, cut a hole in the cover so it fits with the adaptor in question (see figure 6).

Figure 6



If the chain conveyor must be placed in an angle of 10°-30° (SR60-120), a chain conveyor with intermediate plate and extended carriers is used. The inlet hopper is positioned minimum 400 mm from the tail section. A hole must be cut in the intermediate plate, so that the conveying material (grain) comes through the inlet hopper, lands on the intermediate plate and is conveyed down through the hole to the lower chamber by the return carriers (see figure 7)

Figure 7

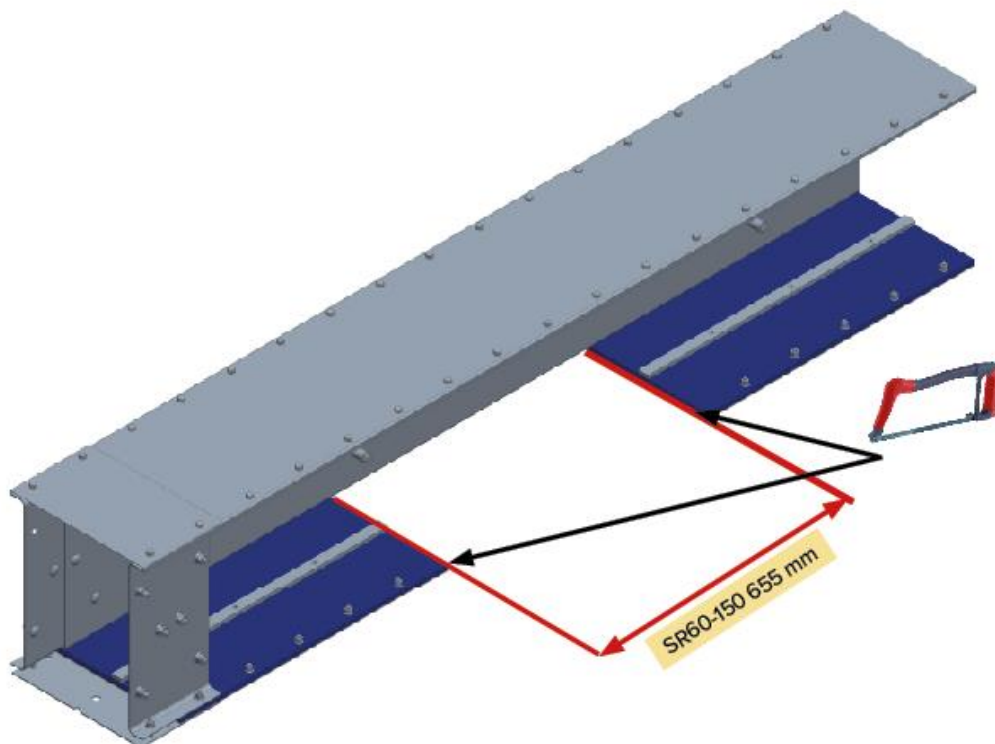


Mounting of intermediate outlet

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- and motor controlled. The intermediate outlet can be supplied with end stop switch, which gives a signal to the conveying system's control of the slide position (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, where the intermediate outlet should be. The dimension of the hole to be cut for the intermediate outlet should be the same as the width of the intermediate + 5 mm (see drawing below).

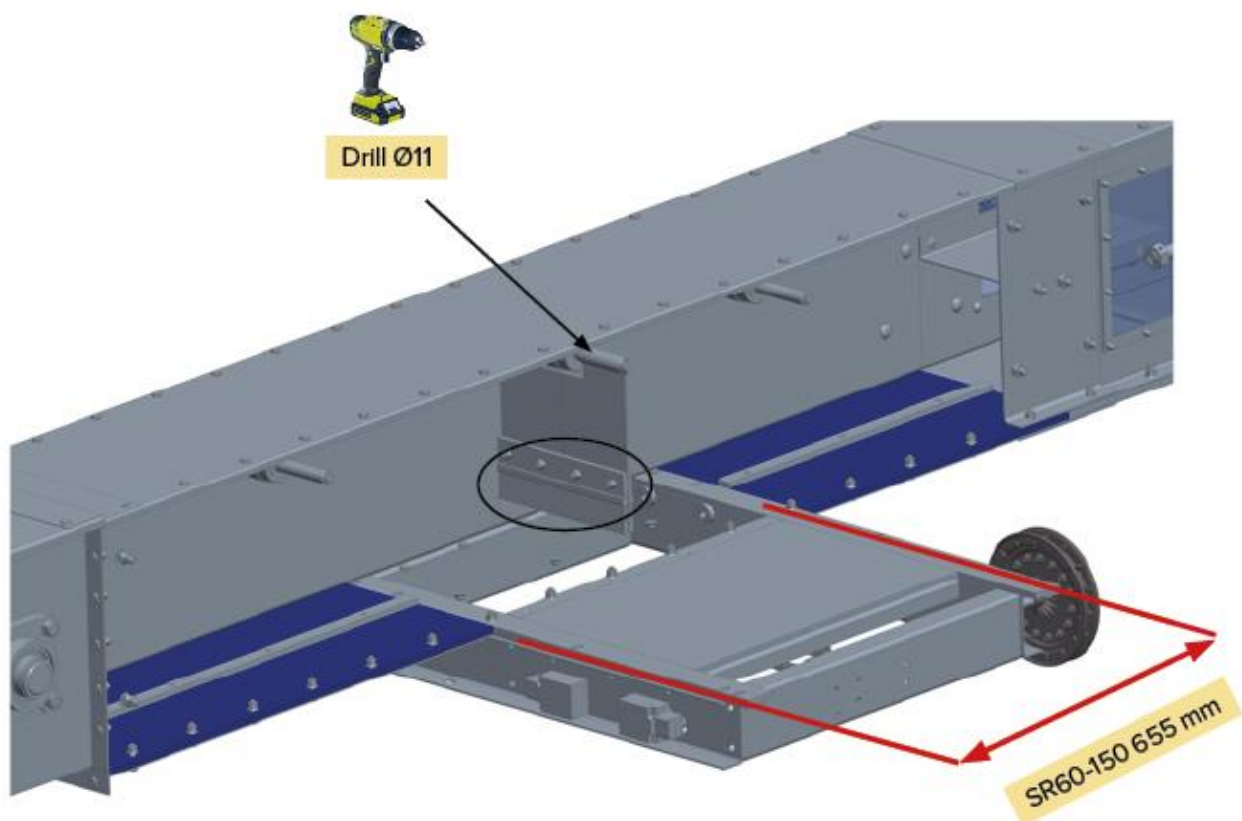
The intermediate outlet must be mounted directly upon the flanges at the sides of the chain conveyor. This gives a flat bottom when the slide is closed.

The outlet cleaner must be placed above the place where the intermediate outlet is mounted, in the same height as the return rollers, and in the middle above the intermediate outlet (see picture).

The outlet cleaner brush can be adjusted up and down. In order to achieve maximum benefit from the outlet cleaner, it is important to adjust the outlet cleaner properly. Therefore, after the chain is mounted and tightened, adjust the height of the brush. The height must be such that the tip of the bristles must protrude a maximum of 2 mm down over the chain surface.

(see marking at the outlet cleaner).

Fig. 9



If end stop switches are to be used, these should be mounted as shown in the picture below (figure 10). The arms of the contact must be installed in a way that a signal is given both in case of open and closed position.

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

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

When installing outside, you must use a rain cover for intermediate outlet see figure 11.

Figure 10

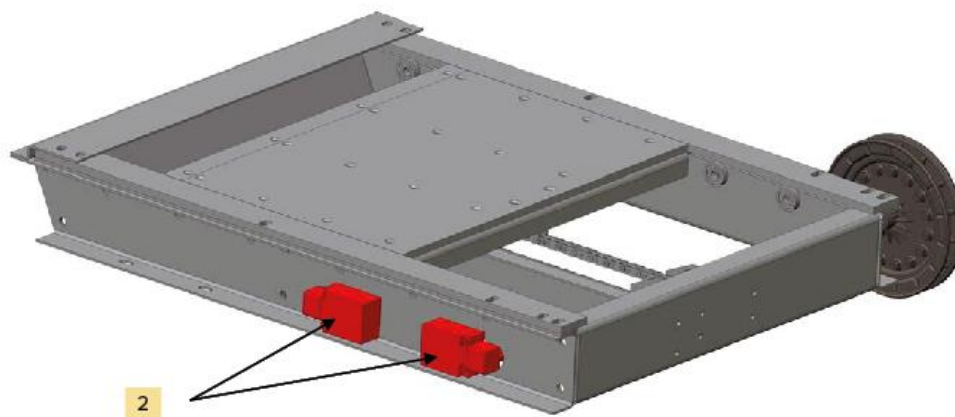
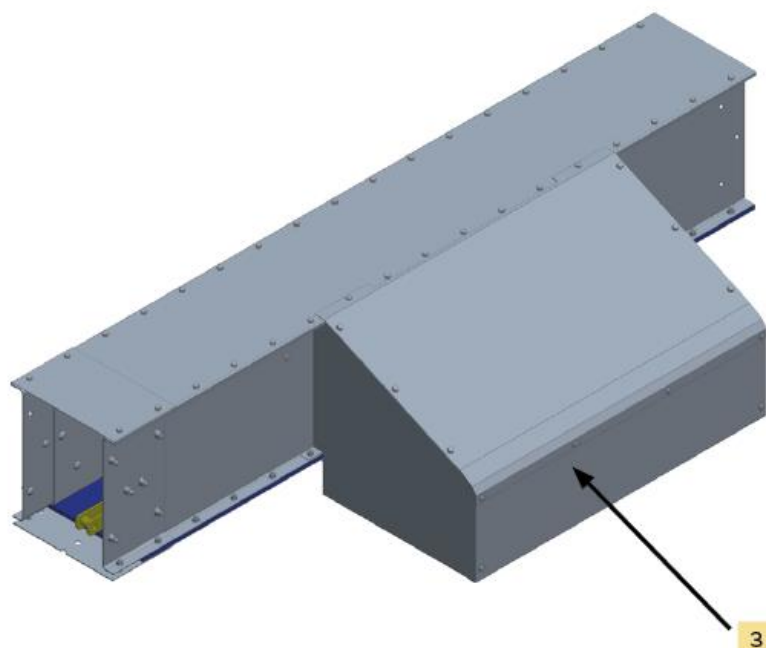


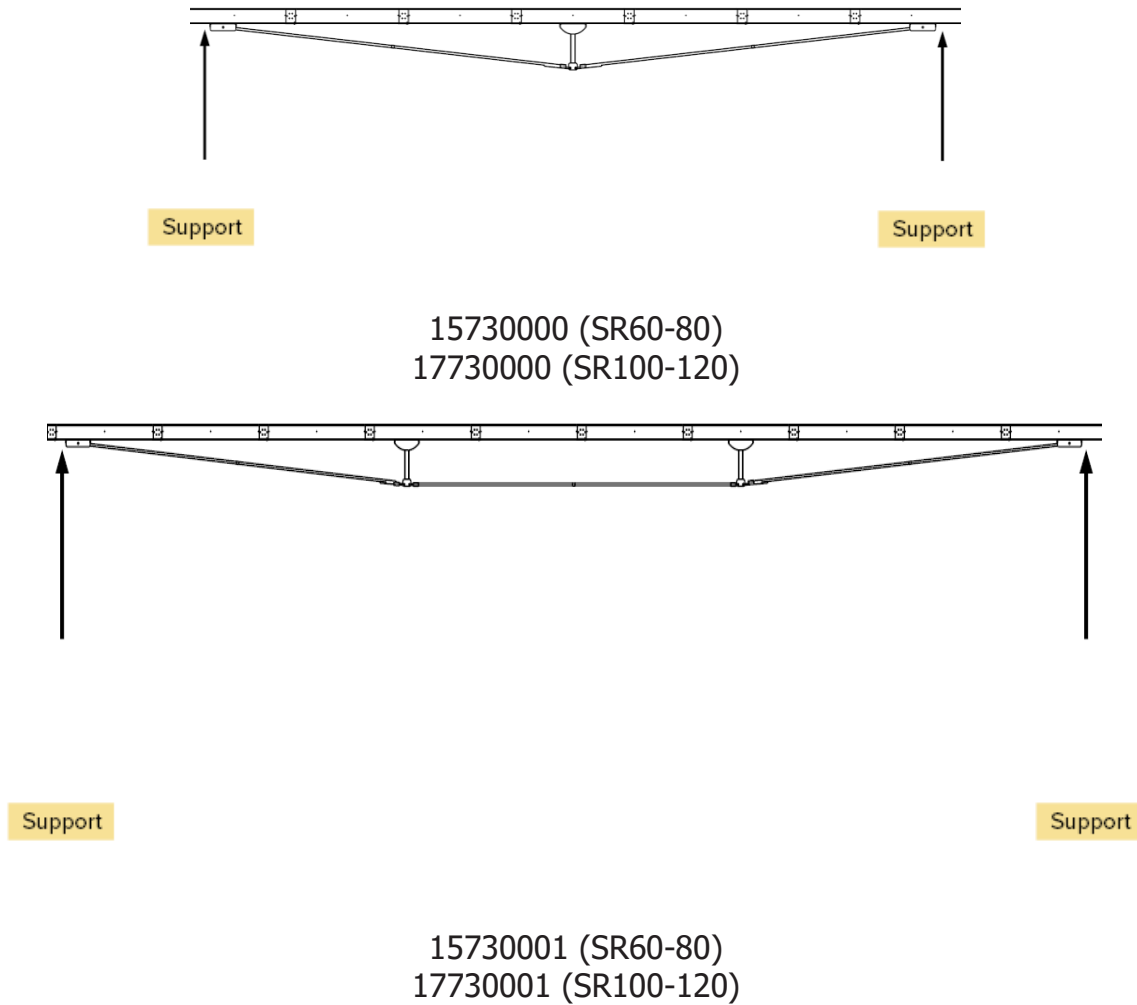
Figure 11



Mounting of bracing support

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

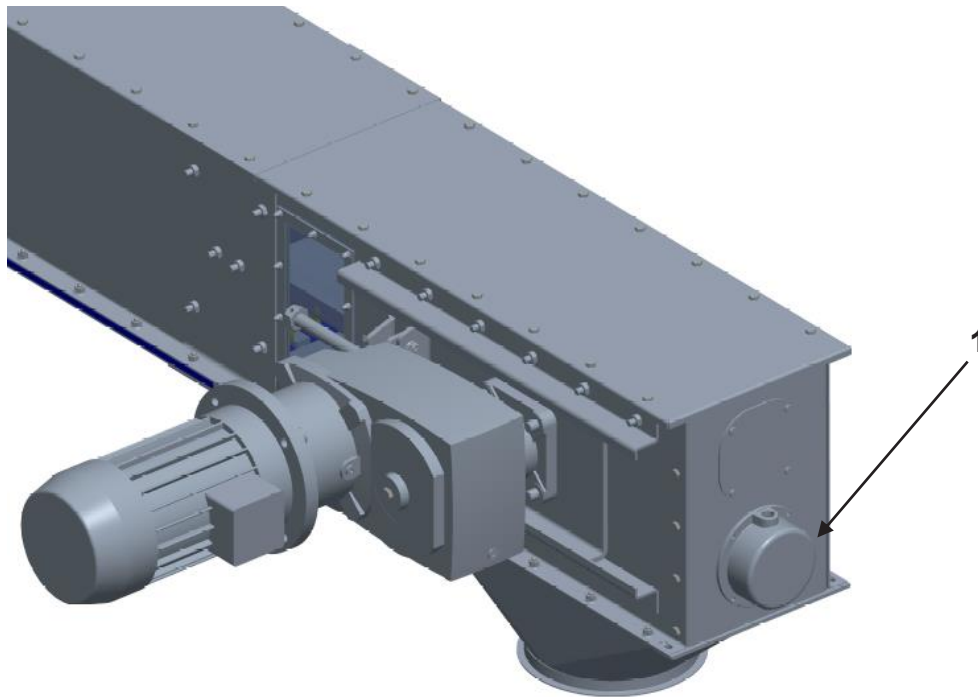
Figure 12



Overflow sensor is placed on the drive section (see figure 13 position 1). Overflow sensor is as a standard placed in the lower position (see position 1). When an intermediate outlet is mounted under the drive-section, the overflow sensor is moved to the upper position. If the chain conveyor is in inclining (10° - 45°), the overflow sensor can be moved to the outlet hopper instead.

Concerning electricity connection, see supplier instructions.

Figure 13



Pit conveyors are assembled in the same way as standard chain conveyor.
 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 14-15.

Figure 14

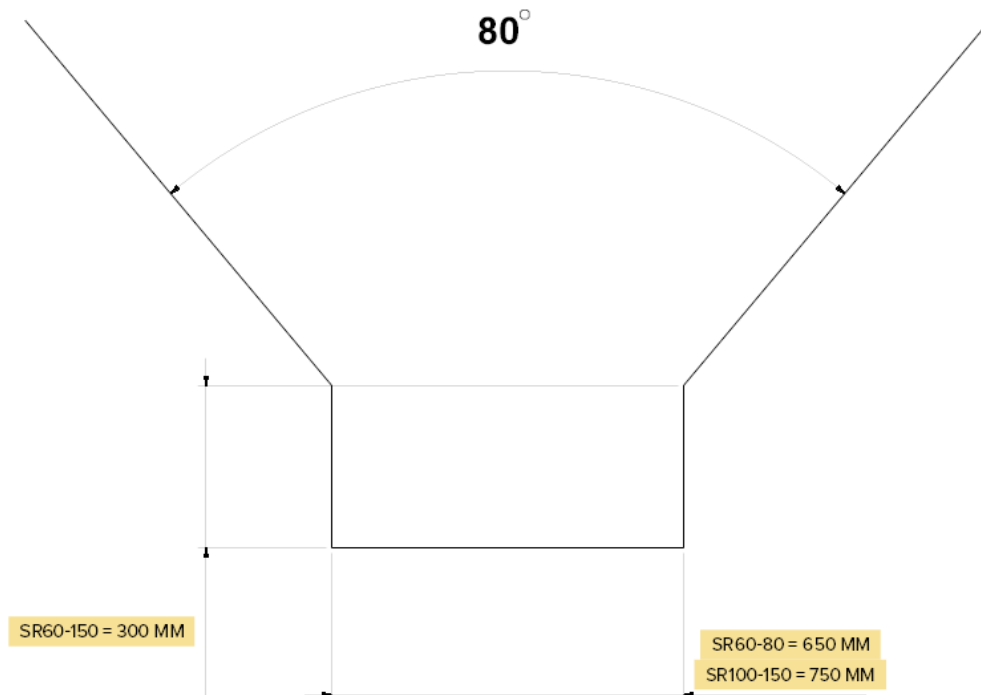
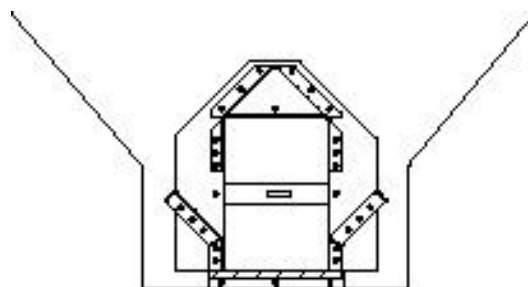
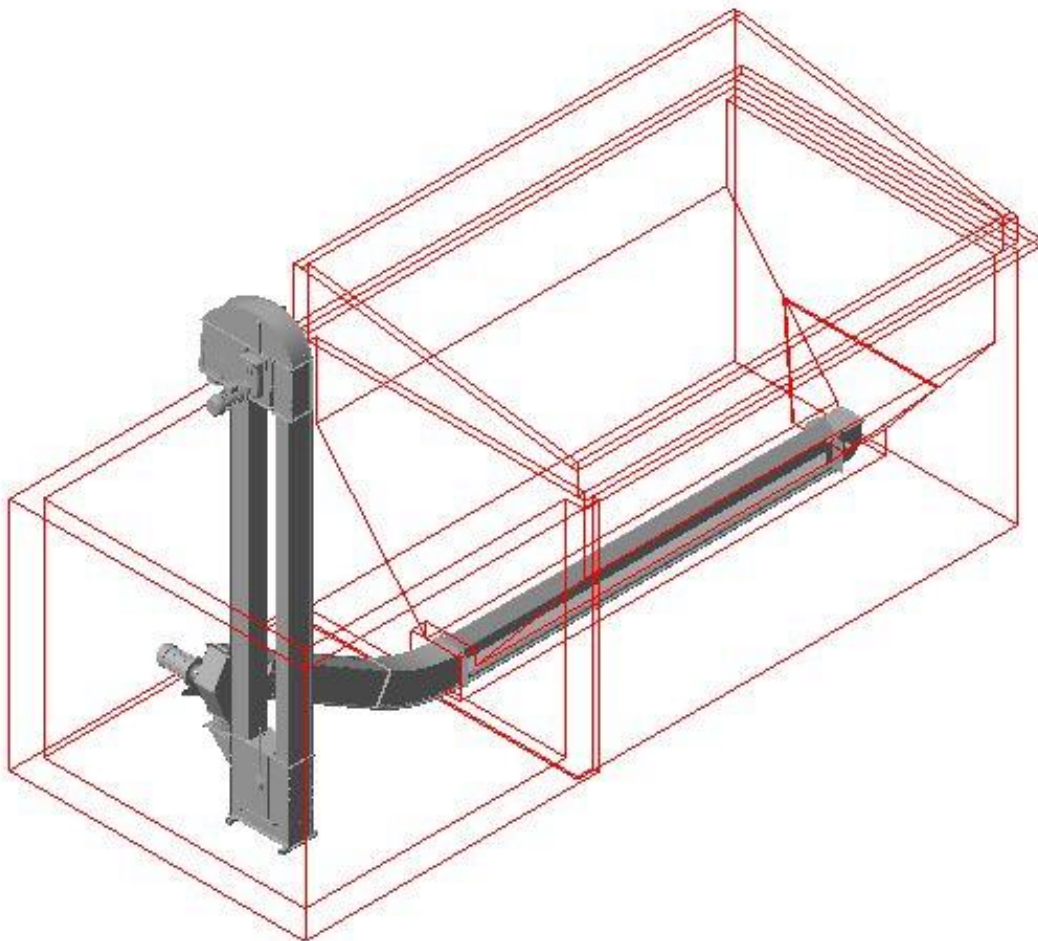


Fig. 15



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 16).

Figure 16



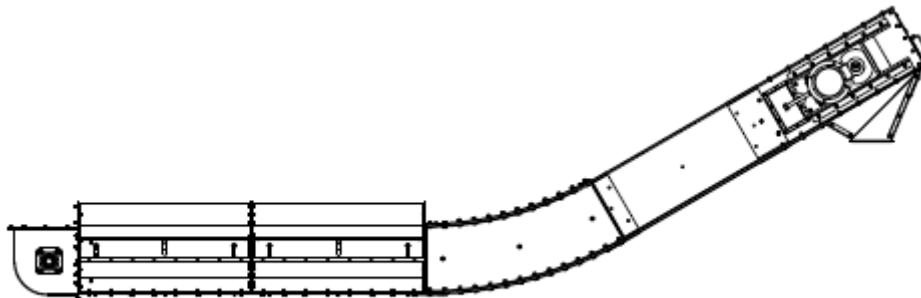
If there are problems with the groundwater when digging a service pit, or if you want to use a pit conveyor together with a tip box placed on a level floor, you can use an extension with bend a modified outlet.

This raises the outlet of the chain conveyor (see figure 17).



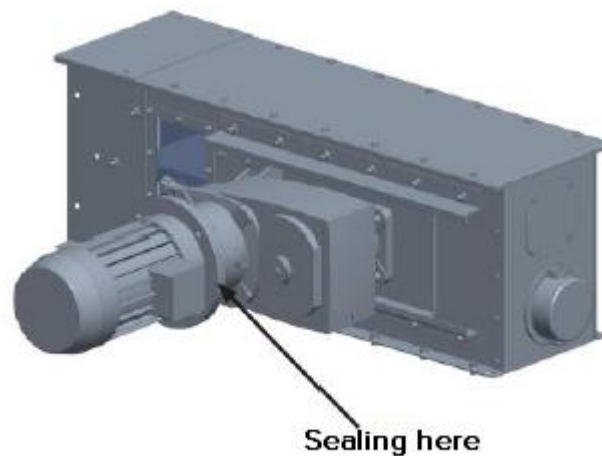
When using bend, you use chain with extended carriers and extensions with intermediate plate.

Fig. 17



Sealing of flange between gear and motor

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



Electrical equipment

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



During installation, please be aware of the voltage and data indicated on the motor data plate.

The terminals of the motor are connected according to the instructions on the motor. The motor is secured with a thermal protection and a lockable circuit breaker, as otherwise the warranty from the motor manufacturer will be cancelled (thermal protection and circuit breaker are 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 EN60204-1 and EN60079-14. Starting up of 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 data from the converter and the data plate.

Potential equalization:

There is an external terminal for connecting the equalization connection to the motor. 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 operating with an empty chain 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 will, however, depend on the crop.

Maintenance



During maintenance work, the safety regulations, which are described in the section 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 circumstances by your own hands. If necessary, disassemble the chain conveyor. Parts that might be worn are replaced at the same time. However, foreign objects must always be avoided and must not enter the machine.

Please note that the safety of motors, gear and bearings is subject to compliances 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 safety switch will disconnect the power supply if the motor is overloaded or in case of power supply fault. Fuses and motor safety switch 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 of one of the center sections, and thus you can lift up the chain and check the tension and the tightening of the chain (see previous section under installation).

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

Equipment	Manufacturer	Maintenance requirements	Intervals 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
Traction chain	SØBY	Control of tension	Tension is controlled once after 100 operating hours. After that, tension is checked for every 1000 operating hours, however at least once a year
Traction chain	SØBY	Sign of abrasion or weakness in chain locks	Controlled for every 1.000 operating hours or once a year if there should be signs of abrasion or weakness in chain lock. 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 operation hours
Motor	Nordgear	Inspect motor and remove layer of dust or similar on a regular basis	Bearings must be replaced for every 30.000 operation hours

Gear	Nordgear	Control of abrasion, layers of dust and leak	<p>It is important to emphasize that the explosion safety is subject to the maintenance required below:</p> <p>Dust layer more than 5 mm must be removed by a vacuum cleaner. For 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.</p> <p>Oil level is checked once a year. Every 10,000 operating hours, the oil should be replaced.</p> <p>Also, a regular control of noise is carried out.</p>
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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 moved regularly.

At least once a year the whole 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 meals and the like, all inlets and outlets must be controlled for free passage.

Check that the carriers are in good condition 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

Error	Possible cause	Advice
The chain conveyor does not start	The power supply is disconnected	Check electric power cabler and replace if necessary
	The motor fuses are defective	Replace fuses
	The safety switch of the motor is defective	Replace the safety switch of the motor
	The motor is defective	Replace the motor
	A foreign object blocks the chain conveyor	Remove the foreign object by suitable means
The motor stops / is overloaded	A foreign object blocks the chain conveyor	Remove the foreign object by 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 cabler 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

Declaration of Conformity

The Company
 Søby Maskinaktieselskab
 Viborgvej 306
 DK-7840 Højslev
 Denmark

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

type: SR60-SR175

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

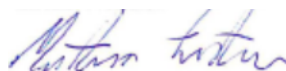
The electrical components mounted on this machine type complies with the following normative documents:

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.

CE UK CA Ex II 3D/- Ex III C 135C° Dc/- X

Højslev, Nov-22



Morten Frantsen
 Co-Owner

Residual Risk

The chain conveyor is produced in accordance with the health and safety 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 and limb of a third party. See Declaration of Conformity.

Supplier Instructions

Potential equalization:

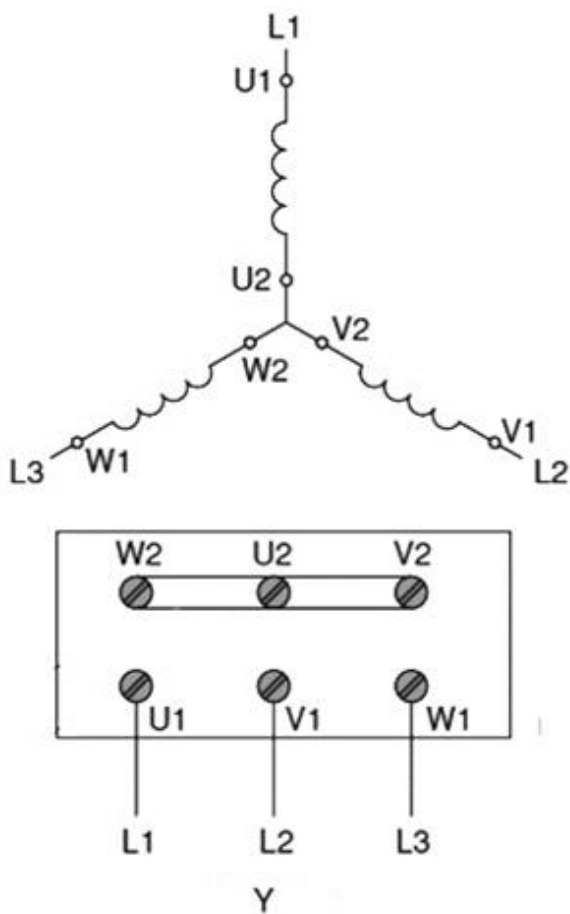
There is a terminal for connecting the equalization connection in the terminal box of the motor. The connection must be carried out in accordance with the instructions in EN60079-14.

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

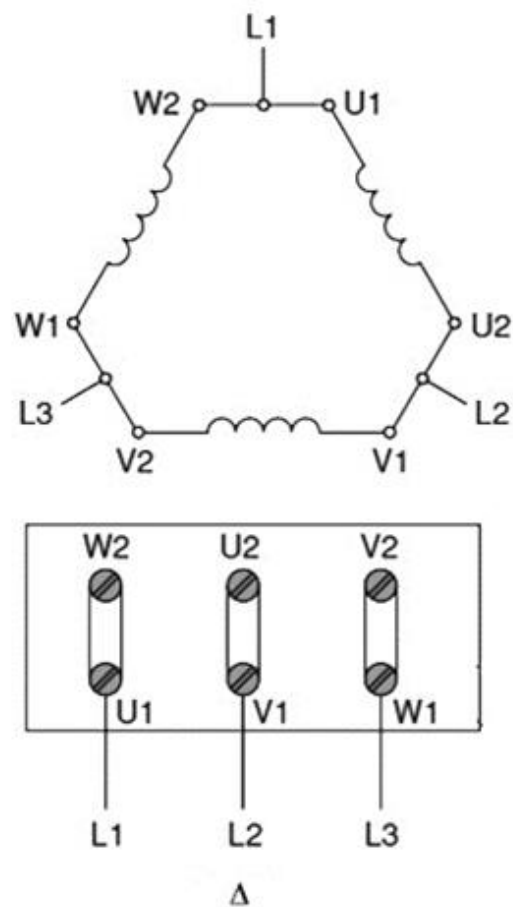
Standard motor terminal connection diagrams

3-phase single-speed motors:

Connection in a Y



Connection in a Δ



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

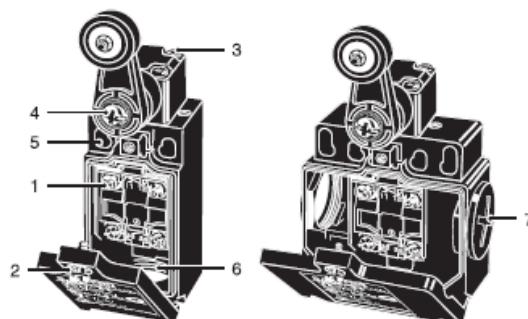
The Switch contacts can be used with either standard loads or microloads. Once the contacts have been used to switch a load, however, they cannot be used to switch smaller loads. The contact surfaces will become rough once they have been used and contact reliability for smaller loads may be reduced.

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.

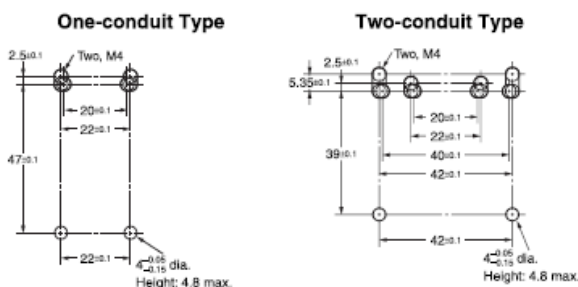
1	Terminal screw	0.6 to 0.8 N·m
2	Cover mounting screw	0.5 to 0.7 N·m
3	Head mounting screw	0.5 to 0.6 N·m
4	Lever mounting screw	1.6 to 1.8 N·m
5	Body mounting screw	0.5 to 0.7 N·m
6	Connector, M12 adaptor	1.8 to 2.2 N·m
7	Cap screw	1.3 to 1.7 N·m



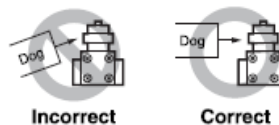
Switch Mounting

- 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.

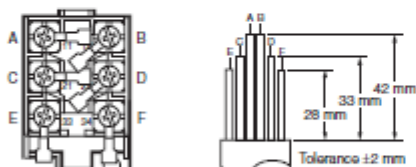


Wiring

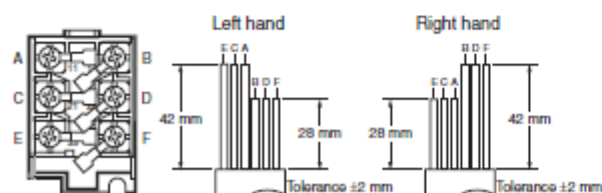
Wiring

- 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)



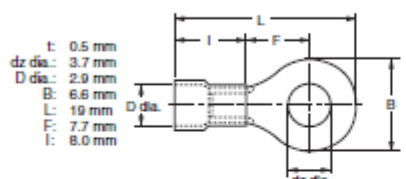
Two-conduit Type (3 Poles)



- 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.

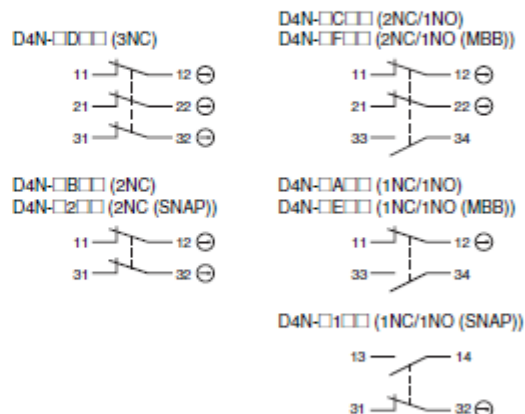
Manufacturer	Type
J.S.T. Mfg. Co.	FN0.5-3.7 (F Type) N0.5-3.7 (Straight Type)



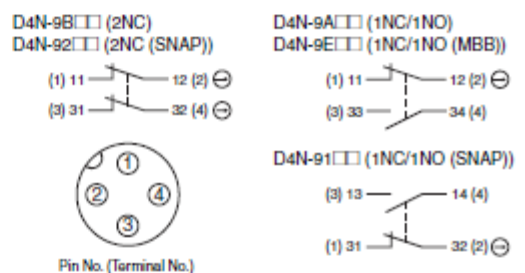
Contact Arrangement

- The contact arrangements are shown below.

Screw Terminal Type



Connector Type



Pin No. (Terminal No.)

- 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.

Smøret	Angivelse på typeskilt	DIN (ISO) / omgivelsestemperatur						
Mineralolie	CLP 680	ISO VG 680 0...40 °C	Alpha EP 680 Alpha SP 680 Optigear BM 680 Optigear Synthetic 1100/680	Renolin CLP 680 Renolin CLP 680 Plus	Klüberoil GEM 1-680 N	Mobilgear 600 XP 680	Omala S2 G 680	Carter EP 680 Carter XEP 680
	CLP 220	ISO VG 220 -10...40 °C	Alpha EP 220 Alpha SP 220 Optigear BM 220 Optigear Synthetic 1100/220	Renolin CLP 220 Renolin CLP 220 Plus Renolin Gear 220 VCI	Klüberoil GEM 1-220 N	Mobilgear 600 XP 220	Omala S2 G 220	Carter EP 220 Carter XEP 220
Syntetisk olie (polyglykol)	CLP 100	ISO VG 100 -15...25 °C	Alpha EP 100 Alpha SP 100 Optigear BM 100 Optigear Synthetic 1100/100	Renolin CLP 100 Renolin CLP 100 Plus	Klüberoil GEM 1-100 N	Mobilgear 600 XP 100	Omala S2 G 100	Carter EP 100
	CLP PG 680	ISO VG 680 -20...40 °C	Alphasyn GS 680 Optigear Synthetic 800/680	Renolin PG 680	Klübersynth GH 6-680	Mobil Glygoyle 680	Omala S4 WE 680	Carter SY 680 Carter SG 680
Syntetisk olie (kulbrinter)	CLP PG 220	ISO VG 220 -25...80 °C	Alphasyn GS 220 Alphasyn PG 220 Optigear Synthetic 800/220	Renolin PG 220	Klübersynth GH 6-220	Mobil Glygoyle 220	Omala S4 WE 220	-
	CLP HC 460	ISO VG 460 -30...80 °C	Alphasyn EP 460 Optigear Synthetic PD 460	Renolin Unisyn CLP 460	Klübersynth GEM 4-460 N	Mobil SHC 634	Omala S4 GX 460	Carter SH 460
	CLP HC 220	ISO VG 220 -40...80 °C	Alphasyn EP 220 Optigear Synthetic PD 220	Renolin Unisyn CLP 220 Renolin Unisyn Gear VCI	Klübersynth GEM 4-220 N	Mobil SHC 630	Omala S4 GX 220	Carter SH 220



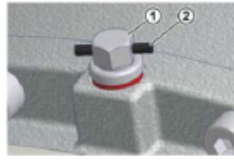
Venting



Oil level

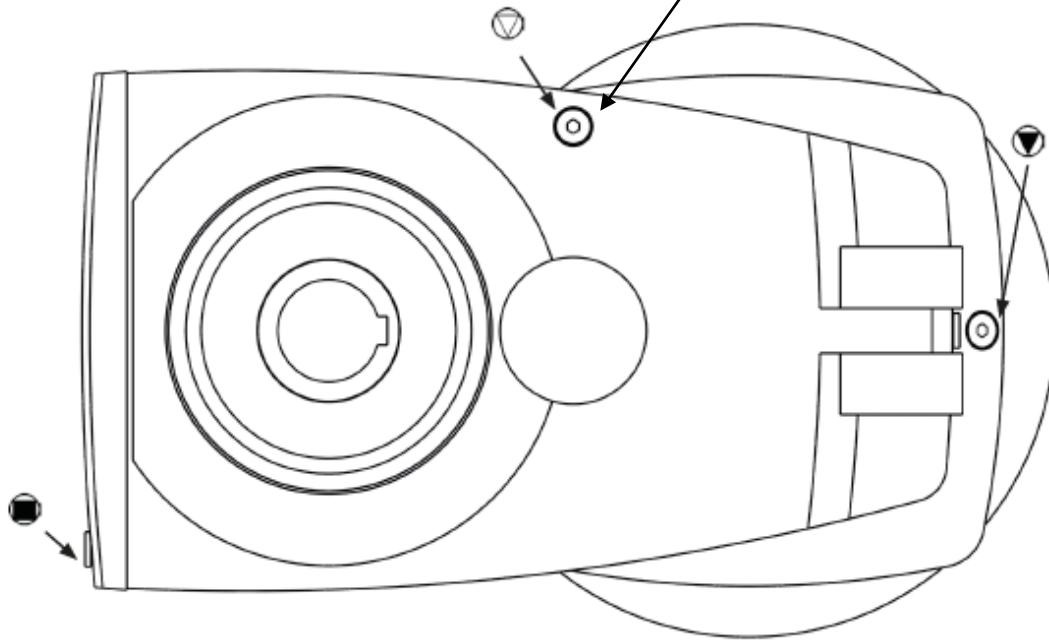
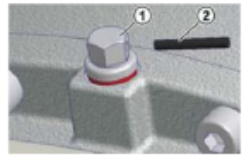


Oil drain



1. Standard vent plug

2. Transport securing device



Working Instructions & Maintenance

Lubricants

LUBRICANTS

Recommended Types

All the units are delivered already filled with synthetic long-life oil.

The safe operation of the units with ISO VG 320 grade lubricant is recommended in the ambient temperature range
-20 to +55 °C (-4 to 131 °F)

Other temperatures require specific recommendations for low or high temperatures to ask the Customer Service.

Temperature range	ISO VG	ARAL	bp	Castrol	EXON	Mobil	TEXACO	TOTAL	Shell
	* 320	Degol GS 320	Energyn SG-XP320	Alphasyn PG 320	Glycolube 320	Glygoyle HE 320	Synlube CLP 320	Carter SY 320	Tivela SC 320
	** 320	Eural Gear 320	---	Vitalube GS 320	Gear Oil FM 320	Mobil DTE FM 320	---	Nevastane EP 320	Cassida Fluid GL 320

* - Synthetic oil

** - Food Industry Approved Oil

► 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

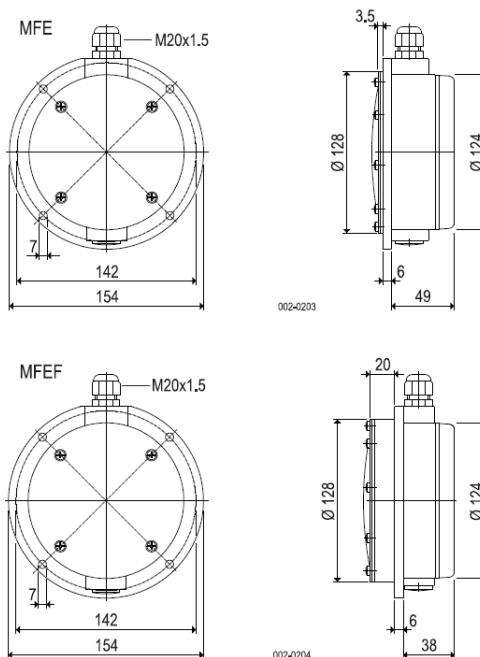
Manufacturer	MOLLET Füllstandtechnik GmbH
Address	Industriepark RIO 103 74706 Osterburken
Name	Membrane level indicator
Type	MFE (GFK) and MFE-A (Alu) MFEF (GFK) and MFEF-A (Alu)
Temperature range	GFK Aluminium -20 °C ... +60 °C -25 °C ... +80 °C
Signal contact	change-over contact, potentialfree
Capacity 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

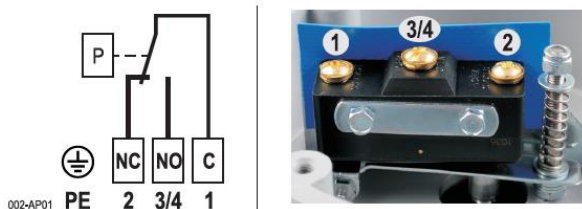
- Check the membrane of visual transport damage.
- Read and follow the safety instructions and the operating instructions, before handling with the device !

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



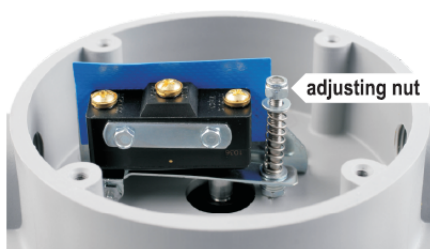
2.4 Cable gland

- 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.

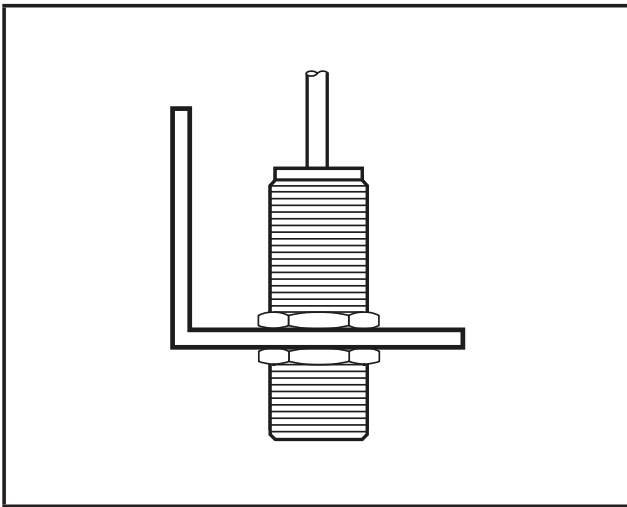
6. Storage

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

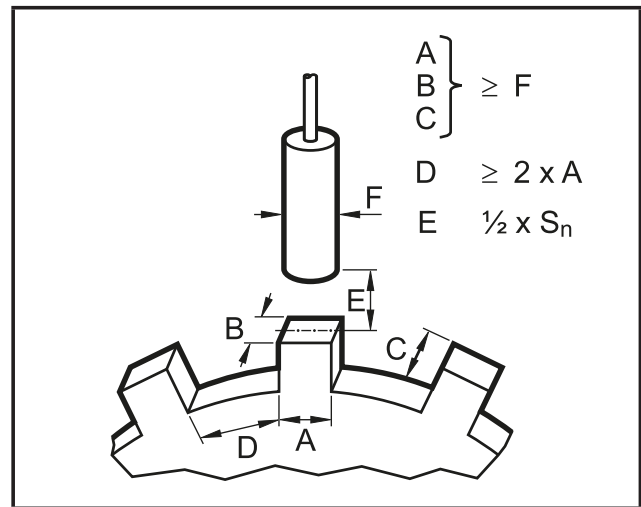
7. Disposal

- 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

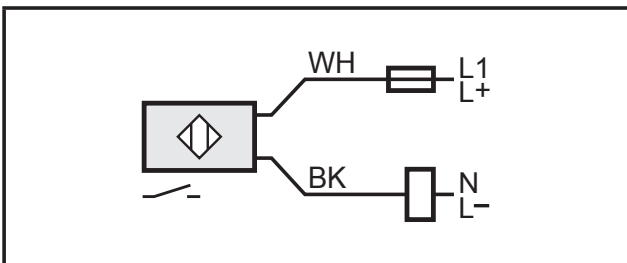


Mounting specifications

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

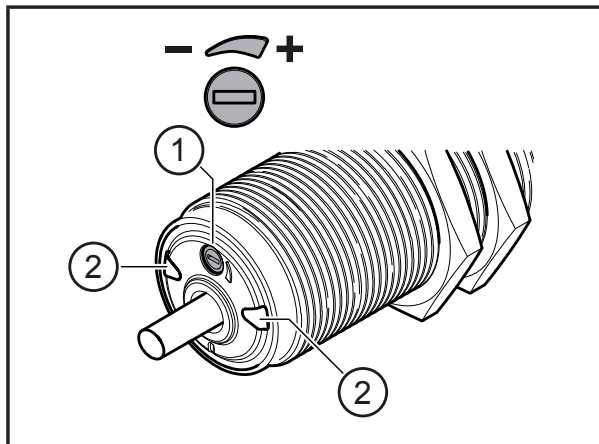


BK = black
WH = white

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.

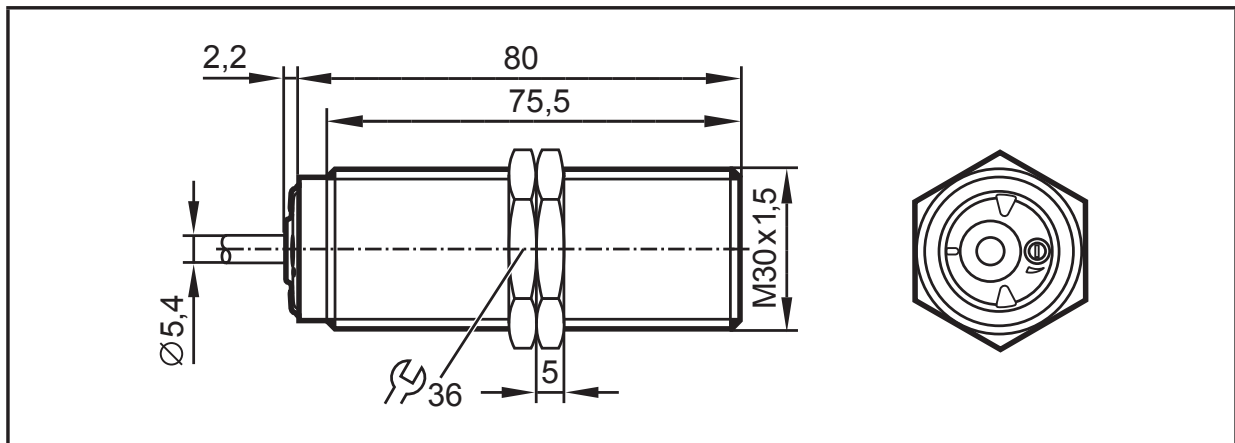
7 Operation

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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