RATAJ®

The operator of the conveyor is obliged to study in detail this instructions for use

ORIGINAL INSTRUCTIONS FOR USE

Operating and maintenance instructions for the SLN - ATEX conveyor for use in potentially explosive atmospheres

Title:	**AXISLESS SCREW CONVEYOR**
Type:	**SLN** variant 38-90 - **ATEX**

Manufacturer:	**RATAJ a.s.**, Doubravice 121, 370 08 České Budějovice, Czech Republic tel./fax: +420/ 387 240 910, 387 241 041, 387 241 630, 724 344 285 tel. +420/ 602 270 883, http:// www.rataj.cz, e-mail: rataj@rataj.cz

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Note down the following information regarding your conveyor. This information is essential to know when ordering replacement parts, in case of loss or theft.

Production number	
Date of delivery	
Contract number	
Supplier	
Streets	
City and postcode	
Telephone, fax	

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1 Home

Dear Customer,

thank you for purchasing the SLN - ATEX type shaftless screw conveyor, (hereinafter referred to as the "**conveyor**"). Please read this manual carefully, especially the "Safety Instructions" section before you start the actual installation of the conveyor. If you have any questions regarding installation, operation, etc., please contact our company. Our desire is to maximize customer satisfaction.

The actual design of the conveyor intended for explosion hazardous environments is always specified in the purchase contract and the manufacturer's confirmed drawing.

Ing. Stanislav Rataj
Chairman of the Board of Directors of RATAJ a.s.

The design of the lightweight shaftless screw conveyor is based on many years of experience and verification in operation. The materials used for production meet the quality requirements of these materials and correspond to the specifications of the production documentation. Each conveyor is manufactured and tested according to verified technical data.

It is the responsibility of the user and operator to become properly familiar with this "User Manual" before starting work. It contains important information on work safety, installation, operation, maintenance and must be considered as part of the conveyor. The trouble-free, safe operation and service life of the conveyor depends to a large extent on its proper and careful maintenance.

If you do not understand any of the information in the instructions, please contact the conveyor manufacturer. We recommend that you make a copy of the Instruction Manual after completing the purchase details of the conveyor and keep the original carefully in case of loss or damage.

When working, follow the safety instructions to avoid the risk of injury to yourself or others in the vicinity.
These instructions are marked with this safety warning symbol in the instruction manual:

<u>When you see this symbol in the instructions, read the following message carefully.</u>

1.1 Product designation

The lightweight shaftless screw conveyor type SLN (hereinafter referred to as "**conveyor"**) is used for conveying bulk materials in straight sections with a slope from 0° to 90° and a maximum length of 120 m. The conveyor can be used underneath a hopper as a discharge or dosing conveyor, as a stacking conveyor for filling tanks, silos, bins, etc. or for continuous transport of bulk materials within a technological process.

Conveyor type SLN is designed for transporting non-sticky materials with grain size 0 - 20 mm (according to the diameter of the screw). The conveyor is mainly designed for transporting fine and coarse dusts, food powders, cereals, plastic crumbs, sawdust, dustings and other similar loose or crushed materials.

Foreign objects and objects of very different shape and size must not be present in the transported material specified in the purchase contract or order.

The ambient temperature can range from -20 °C to + 40 °C.
The temperature of the transported material can range from -20 °C to + 60 °C.

Use in any other way than specified by the manufacturer is contrary to the intended use of the conveyor! This conveyor must only be operated by persons who are familiar with its characteristics and who are familiar with these operating instructions and the relevant regulations for its operation. Any arbitrary changes made by the user to this conveyor will release the manufacturer from liability for consequential damage or injury! If the nature of the conveyor allows it to be used for purposes other than those listed in its designation or prohibited activities, the user (if he wishes to carry out such activities) must consult with and obtain written approval from the manufacturer.

2 Safety instructions

When working, follow the safety instructions to avoid the risk of injury to yourself or others in the vicinity. If an explosion is detected in the equipment downstream of the conveyor (in front of and behind the conveyor), the conveyor must be shut down immediately.

The carrier complies with the requirements of occupational safety and hygiene, environmental protection and fire safety as specified in generally applicable legislation and relevant technical standards.

2.1 Prohibited activities

- **It is forbidden to transport volatile and explosive substances on the conveyor.**
- **It is forbidden to operate the conveyor with any defect in the conveyor design or mechanism and without conveyor safety features (e.g. sensors).**
- **It is forbidden to operate or use the conveyor if any flange, cap, inspection and inspection opening, inlet hopper, outlet or conveyor piping is removed or damaged.**
- **It is forbidden to touch moving parts of the conveyor.**
- **It is forbidden to carry out maintenance, cleaning and repairs while the conveyor is running and unless the conveyor is secured against accidental or automatic start-up.**
- **It is forbidden to disable safety, protection and safety devices (e.g. sensors).**

- **It is forbidden to operate the conveyor in an environment with a fire hazard of flammable liquids and with an explosion hazard of flammable gases and vapours.**
- **Any manipulation in the filling hopper and outlet opening is forbidden during conveyor operation!**
- **It is forbidden to empty the conveyor during normal operation (except for cleaning the conveyor).**
- **It is forbidden to switch on the reverse operation of the conveyor for any purpose. Exceptions for cleaning can only be confirmed in the purchase contract or in writing!**

2.2 Work safety

- Operation and maintenance may only be carried out by physically and mentally fit personnel over 18 years of age who have been demonstrably trained in the operation and function of the conveyor and who are familiar with the safety regulations and operating instructions, which must be kept in a place accessible to the operator.
- Only adjust, maintain and clean the conveyor when the conveyor is at rest and the main switch is switched off and locked and the power supply is disconnected.
- Do not lower the conveyor without closed covers, hoppers, inlets and outlets.
- Do not touch moving parts of the conveyor.
- Work on electrical equipment may only be carried out by personnel with the appropriate electrical qualifications and authorization. Operators not meeting these requirements may not carry out such work under any circumstances.
- The conveyor may be used only for the purposes for which it is intended and technically suitable and in accordance with the conditions set by the manufacturer and which, in its technical condition, complies with the regulations for ensuring occupational safety and hygiene.
- The operator must take care to maintain order and cleanliness around the conveyor and in particular to check, lubricate and clean all functional elements.
- If the operator discovers a defect or damage that could jeopardise work safety or the operation and function of the conveyor, he must not put the conveyor into operation and must immediately ensure.
- Informing the conveyor manufacturer.
- The rotating screw must work in the direction of the arrow on the conveyor during normal operation.
- Safety signs, symbols and inscriptions on the conveyor must be kept in a legible condition. If they are damaged or illegible, the user must restore them to their original state.

- Covers, hoppers, outlets and end flanges may only be removed, dismantled or tipped after the conveyor has been completely stopped and the conveyor has been switched off. All covers and flanges must be properly secured in the protective position when the conveyor is in operation.

- The covers marked with the symbol (black triangle with black lightning bolt on yellow background) cover the electrical equipment compartments. Before removing the covers marked in this way, the electrical equipment of the conveyor must be disconnected from the mains and switched off!
- Places marked with a symbol (hand near the screw conveyor or the symbol of a rotating circle) indicate dangerous places where limbs can be caught by the screw conveyor.
- No manipulation in the filling hopper and discharge opening during conveyor operation!
- Protective equipment (gloves, work clothes) must be used when cleaning the conveyor. In the case of reversing the conveyor, the operator must ensure that the conveyor is switched off and that the conveyor is not started automatically. After the conveyor has been switched off, the operator unscrews the end flange or cover (at the opposite end from the drive) and, with the utmost care and observing all the safety precautions given in this manual, switches on the conveyor for a short time (a few seconds) by reversing. The material will begin to fall out of the conveyor. The operator may repeat this procedure several times during the cleaning process.
- After cleaning the conveyor, the operator screws on the end flange (lid) of the conveyor and ensures that the conveyor is ready for operation (i.e. blocks the reverse operation), or switches the control to normal operation (i.e. the screw rotates according to the direction of rotation mark located on the conveyor).

3 Fire protection

The conveyor shall not be equipped with fire extinguishers. The user is obliged to secure the building where the conveyor is installed with suitable fire extinguishing agents of an approved type, in adequate quantity, placed in a visible location and protected against damage and misuse. Fire extinguishers shall be subject to regular inspection and the operator shall be demonstrably familiar with their use as required by the relevant law and decree.

In connection with the above warning and in accordance with the provisions of the relevant law, the user is obliged to act in such a way as to prevent the occurrence of fire. This means that flammable liquids or other hazardous substances and gases must not be stored in the vicinity of the conveyor when it is in operation, that open flames must not be used, that smoking must not be allowed and that the manufacturer's recommended working procedure must be followed.

- It is forbidden to extinguish an electrically energized conveyor with a water or foam extinguisher! Danger of electric shock!
- The manufacturer does not equip the conveyor with fire extinguishing equipment and it is the user's responsibility to provide the workplace in accordance with the relevant decree, i.e. to install a manual fire extinguisher in a suitable place.
- Electrical equipment must not be extinguished with water! The conveyor must have a powder, snow or halon extinguisher and the operator must be familiar with its use. If the conveyor has a water or foam extinguisher, it may only be used in the event of a fire after the power has been switched off!

- All places that are heated during operation of the conveyor (electric motors, gearboxes, etc.) must be cleaned regularly of settled combustible dust and other impurities so that the thickness of the layer never exceeds 1 mm.

4 Work hygiene

Since the conveyor cannot be used independently without downstream technologies (it works in a technological line) and due to the various possibilities of its location, the user is obliged to pay due attention to the location of the conveyor with regard to noise and dust emissions already at the stage of project preparation. Before putting the conveyor (line) into operation, the user must apply to the relevant sanitary station for approval to operate the conveyor (line). If the maximum permissible values of noise and dust emissions of the conveyor (line) are exceeded, alternative measures to reduce noise and dust emissions on workers (limitation of exposure time, prescription of PPE, etc.) will result from the amount of the exceedance.

5 Working conditions and working environment

The electric motors are supplied in IP 54 or higher and thus, according to EN 60529, meet the protection against dust to such an extent that it does not interfere with its reliable operation, provided that the surface of the electric motor is regularly cleaned of dust.

- The conveyor can work in an environment (according to EN 33 2000-5-51 ed.3):
  AB 8 outdoor areas and areas not protected from atmospheric influences with low and
  high temperatures
  AE 4light dustiness
  BE2N2 Fire hazard from combustible dusts
  BE3N1 Flammable dust explosion hazard, ATEX zone 21, zone 22

- In connection with the above-mentioned warning and in accordance with the provisions of Act No. 91/1995 Coll., the user is obliged to act in such a way as to prevent the occurrence of fire. This means that flammable liquids or other hazardous substances and gases must not be stored in the vicinity of the conveyor when it is in operation, open flames must not be used, smoking must not be allowed and the manufacturer's recommended working procedure must be followed.

- If the conveyed material contains free water or there is a possibility of freezing (or freezing of the material) in the conveyor, the conveyor must be emptied before shutdown to ensure trouble-free operation of the conveyor when it is started again. Emptying (cleaning) the conveyor is described in the chapter Cleaning the conveyor.
- If dew point formation inside the conveyor may occur due to fluctuations in ambient temperature and consequently the conveyed material inside the conveyor may become stuck or hardened, the user must ensure that appropriate technical measures (thermal insulation, heating cable, etc.) are taken to prevent dew point formation inside the conveyor.

6 Electrical equipment 

- Wiring must be carried out in accordance with the requirements of the applicable regulations and standards that apply to the conveyor, in particular CSN 33 2000-4-41, CSN EN 60204-1 (33 2200) and CSN 33 2000-1 ed.2 and related regulations.
- Protection against electric shock must be carried out in accordance with the requirements of ČSN 33 2000-4-41 and related regulations.
- Work on electrical equipment within the meaning of ČSN EN 50 110 -1 ed.3 may only be carried out by personnel with the appropriate electrical qualifications within the meaning of the relevant ČÚBP decree and familiar with the equipment to the extent required.
- Before putting the equipment into operation, an initial inspection must be carried out in accordance with ČSN 33 1500. It is the duty of the conveyor operator to ensure that regular inspections of the electrical equipment are carried out within the time limits specified in CSN 33 1500.
- The first connection of the conveyor's electrical equipment to the mains must only be made by a suitably qualified electrician who, after connection, must verify the correct functioning of the electrical equipment, including the operation of the conveyor's current protection and safety shutdown.
- The connection of the electrical equipment must correspond to the relevant explosion hazard zone.
- The conveyor must be grounded.
- **If an explosion is detected in equipment downstream of the conveyor, the conveyor must be shut down immediately.**
- **In case a frequency converter or any device allowing to change the conveyor speed is used to control the conveyor's conveying power, the maximum speed of the screw must never be exceeded (see article 10.1 of this manual).**

7 Conveyor location

The conveyor is part of the process line and its location depends on the user's requirement. It can be positioned at all stages of the process line. Placement in the process line means the connection of the conveyor inlet and outlet to the user's technology. If the user places the conveyor freely, without the knowledge of the manufacturer, he must ensure the design of the conveyor and protective safety features according to ISO/TR 9172.

8 Description of the conveyor operation

The conveyor works on the principle of a freely rotating shaftless screw of lightweight design in a circular cross-section. The rotation of the screw moves the conveyed material from the filling hopper towards the discharge opening. There are no bearings along the entire length of the conveyor and therefore, in order to ensure optimum transport of the material and centring of the screw in the pipe, it is necessary to fill the conveyor in the entire cross-section.

If the **level of** the conveyed material in the hopper **drops** below the specified minimum level, the level sensor (located in the filling hopper) sends a signal to the user's switchboard to stop the conveyor.

If **the level of** the conveyed material in the hopper **rises**, the conveyor is started again. The exact switching on and off function is designed for each specific conveyor separately based on the user's requirement.

If **the level of** the conveyed material **rises** above the specified maximum level in the discharge, the maximum level sensor transmits an emergency signal to the switchboard to immediately stop the conveyor and declare a fault. In this case, operator intervention is required to determine the condition and decide on the next procedure for putting the conveyor into operation.

The exact switching on and off function is designed for each specific conveyor separately based on the user's requirement.

9 Technical description

The shaftless screw including the pipe is supplied in stainless steel (screw AISI 302, pipe AISI 304, AISI 316).

The conveyor consists of the following parts (see annex):

- stainless steel lightweight shaftless screw type SLN including bracket
- stainless steel flange pipe
- stainless steel inlet hopper (filling opening)
- stainless steel spout
- hopper minimum level sensor (Ex version)
- Maximum level sensor in discharge (Ex version)
- drive station consisting of an electric gearbox (Ex version)
- fasteners
- Connecting hose (Ex version) if installed

All of the above conveyor parts must be certified and fit the relevant explosion hazard zone when replaced (repairs, maintenance).

9.1 The shaftless screw

Stainless steel shaftless screw (stainless steel according to ASTM standard - AISI 302) is supplied with precisely defined dimensions (outer diameter, thread pitch, inner diameter, thickness). The carrier provides the mechanical connection of the driving force of the electric gearbox to the shaftless screw.

9.2 Flanged pipe

Stainless steel flange pipe (ASTM stainless steel - AISI 304, AISI 316 or equivalent) is supplied in various diameters according to the outside diameters of the screws. The wall thickness of the pipe is determined by the type of material to be conveyed.

9.3 Input hopper

The stainless steel inlet hopper (stainless steel according to ASTM standard - AISI 304, AISI 316 or similar) is supplied in different dimensions depending on the type and quantity of material to be conveyed, or a transition piece is supplied to be directly mounted on the existing equipment (bins, silos, conveyor routes, etc.).

In cases where the hopper is used for bagging or manual filling, the user must use a protective grating, which can be supplied as an accessory in stainless steel.

9.4 Exit

The discharge opening is supplied in various dimensions depending on the type and quantity of material to be conveyed, or a transition piece is supplied which is directly mounted on existing equipment (bins, silos, conveyor routes, etc.).
The outlet opening **must include a sensor** to ensure that the conveyor is switched off in the event of the hopper filling up, or the conveyor's transport path behind the conveyor.

The emergency sensor in the discharge opening must not be used as an operational maximum level sensor!

9.5 Sensor (MIN) for the level of conveyed material in the hopper

(ignition protection level system (EPL b1) according to EN ISO 80079-37)

The inlet hopper includes a minimum level sensor (usually a propeller sensor) ensuring that the conveyor is switched off if the level of the conveyed material in the hopper drops. The conveyor can be switched on again only after the minimum level sensor has been filled with the conveyed material.

The user of the conveyor is obliged to carefully read the instructions for use of the level sensor and follow the instructions given in this manual.

The user must ensure that the conveyor is switched off when the level of the conveyed material falls below the minimum level sensor! This sensor must be maintained in a functional and operable condition and regularly checked.

Sensor (MAX) for the level of conveyed material in the discharge hole

(ignition protection level system (EPL b2) according to EN ISO 80079-37)

In order to ensure immediate shutdown of the conveyor in case of filling the discharge opening with the conveyed material, a sensor for the maximum level of the conveyed material is installed in the discharge.
The user of the conveyor is obliged to carefully read the instructions for use of the level sensor and follow the instructions given in this manual.

In the event of a full discharge, this sensor sends a signal to the control system to immediately stop the conveyor and signal a fault.
The user is obliged to ensure that the conveyor is switched off when the outlet is full! This sensor must be maintained in a functional and operable condition and regularly checked.

9.6 Driving station - electric gearbox

The drive station consists of an electric motor and gearbox and is usually connected to the motor flange by a bolted connection. The carrier provides the mechanical connection of the gearbox drive force to the shaftless screw. For locations in hazardous areas, drive stations complying with the European Union Directive 2014/34/EU are supplied.

The user of the conveyor is obliged to carefully read the manual of the electric gearbox and follow the instructions given in this manual.

9.7 Fasteners

The conveyor includes fasteners for the flange pipe and the electrical transmission line. The fasteners include sleeves for hanging or supporting the conveyor.

10 Basic technical data

The basic technical data of the conveyor are always specified in the purchase contract. These are mainly the outer and inner diameter of the screw, the pitch of the screw thread, the thickness of the screw, the diameter of the pipe, the conveying capacity and the power input of the electric gearbox.

10.1 Maximum permissible speed for each type of conveyor

In case a frequency converter or any device allowing the conveyor speed to be changed is used to regulate the conveyor's conveying power, the maximum peripheral speed of the screw of 1.0 m/s and the maximum screw speed as specified below for the respective screw diameter must never be exceeded:

Table 1 - SLN 38 - 90 maximum screw speed

Indicator	**Unit**	**Value**				
Type		**SLN**				
Option		**38**	**52**	**61**	**68**	**90**
Diameter of the screw	mm	38	52	61	68	90
Conveyor diameter	mm	55	70	75	90	114
Radius	mm	1800	1530	1530	1570	1590
Maximum length	m	50-70	50-70	30-50	30-50	20-30
Traffic performance	$m^3 .hod^{-1}$	0,001-0,5	0,001-1,5	0,001-1,5	0,001-4,0	0,001-15
Maximum speed	(rpm)	502	367	318	280	212

10.2 Derived variants

The derived variants are based on the same transport principle and the same security. They differ only in screw diameter, pipe diameter and gearbox type. As these conveyors are designed for the transport of several types of conveyed materials with very different physical properties, the design of the respective screw diameters, piping and gearboxes is dealt with separately for each individual conveyor and is always specified in the purchase contract.

11 Controls

(ignition protection level system (EPL b1 and EPL b2) according to EN ISO 80079-37)

Since the conveyor is installed in technological lines, the control elements are always designed by the user according to the respective technology for operation - see the user's operating rules. The actual control signals for switching the conveyor on, off and checking the conveyor must be designed in accordance with ČSN EN ISO 80079-37 so that these controls meet the ignition protection level (EPL b1 and EPL b2). If the controls allow manual operation in addition to automatic operation, the user must in any case ensure that all sensors on the conveyor operate without error (see paragraphs 9.5 and 9.6 of this manual).

In the event that an explosion is detected in downstream equipment upstream and downstream of the conveyor, the conveyor control system must ensure that the conveyor is shut down immediately.

12 Conveyor operator

Operation in normal operation consists of:

- Starting the machine - automatically or manually according to the user's needs.
- the operation itself consists in ensuring a smooth supply and removal of the transported material.
- switching off the machine - automatically or manually according to the user's needs.

12.1 Commissioning the conveyor

Before the conveyor is actually put into operation, it is necessary to:

- to familiarize yourself in detail with this conveyor operating manual for SLN - ATEX types.
- Check all safety functions (switching on and off) of the installed sensors.
- Check that all inspection and mounting holes and caps on the conveyor are properly covered and secured.
- check the correct direction of rotation of the screw. The direction of rotation of the screw is always marked with an arrow on the pipe or the end cap of the conveyor.

The direction of rotation of the conveyor screw does not have to be the same as the direction of rotation of the electric gearbox fan!

After the above activities have been completed, the material to be transported can initially be loaded into the inlet hopper in small quantities. After correct operation it is possible to pour the material up to the full capacity of the conveyor.

- **Due to the possible formation of dust from the conveyed material in the hopper and in the conveyor pipeline, it is necessary that the operator, when filling the conveyor for the first time (this situation also occurs after the conveyor has been completely cleaned of the conveyed material), gradually fills the hopper and, by switching it on for a short time (about a few seconds) and then switching it off, gradually fills the conveyor pipeline until the conveyor is completely filled with the conveyed material.**
- **If a frequency inverter is used for control (must be specified in the ATEX questionnaire), the operator sets the inverter to a lower speed (approx. 20% of nominal speed) and can fill the conveyor without having to switch it on and off for a short period of time.**
- **Emptying the material from the conveyor before shutting down the conveyor (only allowed in cases of cleaning or changeover to other conveyed material) and idling is not suitable for the conveyor and leads to increased abrasion of the screw and piping. This condition must be avoided.**

Due to the conveyor being empty for the time being (without material), the conveyor may be noisy and vibrations may be generated after start-up. At higher vibrations, the conveyor must be switched off and on again and the conveyor must be gradually filled with material. As the conveyor is gradually filled with material, the screw in the conveyor is centred and the noise and vibration is reduced. If vibrations or high noise or unforeseen situations (screw breakage or twisting, burnt motor) continue, the conveyor must be stopped immediately.

If the chief installer of the manufacturer RATAJ a.s. is not present during the commissioning (this must be explicitly stated in the purchase contract), the user must immediately notify the manufacturer of the occurrence of the unforeseen situation, who will decide on further action.

The design of the conveyor is such that the conveyor is switched off and on when the conveyor is fully filled with material. In the case of the SLN - ATEX type conveyor it is forbidden to empty the conveyor during normal operation (this does not apply when emptying for cleaning the conveyor - see article 14.3).

12.2 Safety instructions

- **The conveyor may be loaded only up to the rated current consumption of the electric motor, which is indicated on the electric motor label.**
- **Work on a conveyor of any kind must only be carried out when the conveyor is at rest and with a safe guard against accidental starting (locking the main switch in the off position).**
- **Protective gloves, work clothing and other appropriate cleaning and maintenance equipment must be used for cleaning and maintenance where there is a risk of hand injury.**

- **All rotating parts of the conveyor are covered (covers with pictograms). Before starting operation, it is necessary to check the correct fixing of the covers, the correct direction of rotation of the screw (see pictograms) and the correct connection of the electric motor.**

12.3 Conveyor maintenance and cleaning

- **The end flange, cleaning holes, inspection or inspection holes must not be scanned while the conveyor is in operation. There is a risk of injury from rotating parts.**
- **Maintenance of the conveyor consists of periodically checking the oil level of the gearbox (see Appendix Gearbox Installation and Operating Instructions) and checking the flange connections of the conveyor pipe**.
- **In cases where the hopper is used for bagging or manual filling, the user must use a protective grating.**
- **It is forbidden to stir any objects, including hands, while the conveyor is running, or to loosen the conveyed material in the input hopper. There is a risk of injury from rotating parts and destruction of the screw.**
- **It is forbidden to stir any objects, including hands, while the conveyor is running, or to loosen the conveyed material in the input hopper. There is a risk of injury from rotating parts and destruction of the screw.**
- **It is forbidden to knock and hammer on the outer conveyor, including the hopper and discharge, in any way and by any means.**
- **The maintenance of the electric gearbox is specified in the manual of the electric gearbox and the maintenance must be carried out according to the instructions given in this manual.**

For optimal operation of the conveyor, it is required that the conveyor is always filled with the material to be conveyed throughout its entire cross-section. This also applies to the on and off state of the conveyor, i.e. the conveyor stops and starts when the conveyed material is fully loaded. In the case of conveying foodstuffs or materials that change their physical properties rapidly, the conveyor must be cleaned before shutting down.
The principle of cleaning consists in unscrewing the end flange (lid) of the conveyor and reversing the shaftless screw.

<u>Emptying of the conveyor can be carried out:</u>

- for horizontal conveyors and with a small inclination of up to 10°, by the conveyor discharge while preventing the material from entering the hopper.
- in the case of inclined conveyors, the front opening or the discharge opening under the hopper. If the front opening is used, the operator must unscrew the end flange of the conveyor. The material that is in the conveyor will spontaneously discharge. For perfect cleaning, the residual material must be emptied from the conveyor pipe by reversing the screw. The reversing of the conveyor must be dealt with separately for

each specific case and must be specified in the purchase contract. For instructions on unscrewing the end flange, see Article 2.2 - Safety at work.

Due to the possible formation of dust from the conveyed material in the hopper and in the conveyor pipeline, it is necessary for the operator to switch the conveyor on several times for a short period of time (about a few seconds) during cleaning (emptying), then switch it off and switch it on again after any dust has settled until the conveyor pipeline is completely emptied.

If a frequency converter is used for control, the operator sets the converter to reverse operation, sets a lower speed (about 20% of nominal) and can empty the conveyor without having to switch it on and off for a short period of time.

In the case of cleaning the conveyor, it is not possible to ensure the function of the minimum level sensor in the hopper (see article 9.5) and therefore it is absolutely necessary that the operator follows the cleaning procedure with the gradual switching on and off of the conveyor and has full control over the cleaning process.

If it is necessary to clean the conveyor completely, the conveyor must first be secured according to paragraph 2.2 Safety of work and then the screw must be unscrewed from the gearbox and the individual parts of the conveyor must be cleaned.

12.4 Removal of settled dust

All surfaces of the conveyor, including the electric motor and gearbox, must be regularly cleaned of settled dust and other impurities so that the thickness of the layer never exceeds 1 mm.

Cleaning instructions must be part of the user's operating instructions for working with flammable substances. The conveyor operator shall follow a cleaning schedule prescribing the nature, extent and frequency of cleaning and the responsibilities of the persons involved. If a significant amount of dust is released as a result of an operational failure, the operator shall immediately remove the settled dust from the entire surface of the conveyor.

13 Mark

Each conveyor is marked with a nameplate containing the following information:
a) manufacturer's marking (conveyor label)
(b) the name of the conveyor (conveyor label)
(c) the type and piping of the conveyor (conveyor label)
d) year of manufacture (conveyor label)
(e) serial number (conveyor label)
(f) weight (conveyor label)
(g) Motor input power and voltage (motor nameplate)
(h) connection to the mains (motor label)
(i) the degree of protection of the electric motor (motor label)
(j) type of gearbox (gearbox label)
(k) the category of equipment

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Certificate number: FTZÚ 22 ATEX 0070X

14 Delivery and acceptance of the conveyor

The conveyor is supplied freely as a separate machine to direct and indirect customers. The conveyor is delivered disassembled or assembled and assembled and put into operation in the presence of the manufacturer's chief assembler. In case the nature of the conveyor (short, simple construction, etc.) allows to send the conveyor assembled without the presence of the chief assembler, this fact must be agreed in the respective purchase contract. The electric gearbox is delivered including the gear oil filling. Acceptance of the delivered conveyor is based on a delivery note issued and confirmed by the customer or user.

15 Installation and commissioning of the conveyor

- Installation and commissioning of the conveyor is carried out in the presence of the manufacturer's chief installer (unless otherwise specified in the purchase contract). The conveyor is fixed to the fixed structure using steel profiles, screws, bolts or dowels.

  The required handling space, especially on the side of the hopper inlet and outlet opening, is approx. 1 m. The wiring of the electric motor and all sensors is carried out by the responsible person of the user and this wiring must comply with the relevant ATEX and ESC standards.

  Before the new conveyor is put into operation for the first time, the direction of rotation of the screw must first be checked **(CAUTION - it may not be the same as the direction of rotation of the electric motor fan!)** and the correct functioning of all sensors. The direction of rotation of the screw is indicated on a pictogram located on the conveyor pipe near the mounting hole of the electric gearbox or on the end cap of the screw, or at a place where the direction of rotation of the screw can be safely checked.

- The direction of rotation of the screw is indicated on a pictogram located at the mounting hole of the electric gearbox or on the end cap of the pipe, or at a place where the direction of rotation of the screw can be safely checked.

  After checking the correct direction of rotation of the screw, the material to be conveyed can be gradually poured into the input hopper in small quantities. Due to the conveyor being empty for the time being (without material), the conveyor is noisy and vibrations may be generated after start-up. At higher vibrations, the conveyor must be switched off and on again and the conveyor gradually filled with material. As the conveyor is gradually filled with material, the screw in the conveyor is centred and the noise and vibration is reduced.
  In the event that vibrations or high noise or unforeseen situations (screw breakage or twisting, burnt motor) continue, the conveyor must be stopped immediately and if the manufacturer's chief fitter is not present during commissioning (this fact must be explicitly stated in the purchase contract), the user must immediately notify the manufacturer.

- **Emptying the material before shutting down the conveyor (only allowed in cases of cleaning or changeover to other conveyed material) and idling is not suitable for the conveyor and leads to increased abrasion of the screw and the pipe. This condition must be avoided.**

16 List of spare parts and accessories

An updated spare parts catalogue can be sent to the user by special order. Direct purchase of spare parts is possible at Rataj a.s., Doubravice 121, 370 08 České Budějovice, Czech Republic.

17 Packaging, transport, storage

The individual parts of the conveyor are packed in shrink wrap or cardboard. Transportation is mainly handled by a collection service or individually. Storage of all conveyor parts is only permitted in dry and covered areas. The electric gearbox must be stored in a position where the gearbox vent screw is located on top. If the conveyor is to be stored for more than 6 months, the metal parts must be preserved.

18 Safety pictograms used on conveyor

- **The user is obliged to keep the pictograms in a legible condition and to ensure their replacement in case of damage. Attach (stick) the pictograms after mounting on the conveyor in visible places from the access directions. Pictograms used and their meaning:**

- **The user is obliged to read this Conveyor User Manual before using the conveyor.**
- **The user must disconnect the conveyor from the power source and follow the instructions before repair, adjustment or maintenance.**
- **The user (operator) must not reach into the area of the rotating parts - possibility of being drawn into the conveyor.**
- **The user (operator) is obliged to keep a safe distance from the conveyor when the conveyor is running.**
- **The user (operator) is obliged to wait until the whole device has reached a standstill and disconnect the conveyor from the power source before removing or opening the covers.**

19 Disposal of the product and its parts

If you are going to dispose of the conveyor, notify the conveyor manufacturer. At the end of its service life, disassemble the conveyor into its individual parts - metals, plastics, rubber and operating fluids. Handle these separated wastes according to the current waste management regulations.

20 Warranty conditions

All repairs, modifications and interventions to the conveyor type SLN - ATEX are excluded for the user and operator. These works may be performed exclusively by the conveyor manufacturer RATAJ a.s.

The manufacturer is not liable for the safety and functionality of the conveyor for explosion hazardous environments if the user performs any unauthorized interventions on the conveyor without the written consent of the manufacturer RATAJ a.s.

20.1 Warranty period

The Seller shall provide a warranty period of 12 months from the date of arrival of the goods to the Buyer or to the place of destination if the goods are shipped directly to the place of destination. An extended warranty period is only possible at an additional cost of 2% for each additional month. This must be explicitly stated in the purchase contract.

20.2 Responsibility for transported material

If a completed questionnaire (or other written document) with full details of the material to be transported, the required transport performance (and if the Seller requires a sample of the material to be transported) is not provided to the Seller in writing no later than upon signing the Contract or upon acceptance of the Buyer's order, the Seller shall not assume any warranty for any damage to the equipment or other damages and all warranty obligations of the Seller with respect to the functionality of the equipment shall be void. If the equipment uses a different material from the sample submitted or a material of a different granulometry, material with over pressure or under pressure or material with different physical and chemical properties than those specified in the contract, the questionnaire or the request for quotation, the Seller assumes no warranty for the functionality of the equipment. The same applies to materials which have not yet been transported by the Seller in the equipment. This fact must be stated in the purchase contract.
The tolerance of physical and chemical properties of the material delivered by the customer is +/- 10%. If the contract includes an annex to the test report of an accredited laboratory from the submitted sample of the transported material, the values stated in the report are binding for both the buyer and the seller.

20.3 Liability for damages

The Seller shall not be liable or responsible for any damage to the equipment or other damages resulting from improper operation of the equipment, unauthorized tampering with the equipment without the Seller's written consent, or the presence of foreign objects or impurities in the material being transported. The permissible manufacturing tolerance of the dimensions of the screw (outer and inner diameter, pitch of the thread) and the pipe (diameter) is +/- 10 mm, the thickness of the screw +/- 5 mm from the dimensions specified in the purchase contract or in promotional materials (brochures, internet, etc.).

The equipment must be used only for the activity for which it is intended and only for the material to be transported as specified in the purchase contract or confirmed order.

The warranty does not cover natural wear of the screw and piping from the material being conveyed, wear of the screw and piping when the conveyor is operating with less than 50% of the material being conveyed full or empty, and defects resulting from faulty electrical installation or improperly set or missing current protection of the electric motor. Also excluded from the warranty are defects resulting from defective operation of equipment upstream and downstream of the conveyor (upstream and downstream of the delivery limit). The purchaser must examine the equipment in a conscientious manner immediately after it has been put into operation and ensure that a complete electrical inspection and, if applicable, a revision of the lifting equipment is carried out. The purchaser must complain in writing about any defects within 7 days of commissioning or during the test run, otherwise the equipment is deemed to be approved by the purchaser. Compensation for possible financial damages resulting from equipment failure is excluded against the seller, unless expressly stated in the purchase contract and unless the seller is proven to be at fault. The Seller shall be liable for compensation up to a maximum of the amount invoiced for the equipment delivered.
If the Buyer purchases separately only some parts of the equipment (e.g. screw, electric gearbox, etc.) or the equipment in spare parts or without obligatory assembly or puts into operation the newly delivered or repaired equipment without the knowledge and consent of the Seller, the Seller does not assume any warranty for the purpose of use, operation, functionality and service life of the delivered parts of the equipment. Any damages and subsequent commissioning of the equipment shall be borne in full by the Purchaser.

20.4 Explosive atmospheres (ATEX)

If the Buyer requires the installation of equipment in an ATEX explosion hazardous environment, it is the Buyer's (or end user's) responsibility to properly complete the questionnaire, sign and send it in writing to the Seller. In case the buyer requests only a part of the equipment (e.g. an electric gearbox) in ATEX design, the equipment thus completed does not meet the technical parameters of equipment intended for ATEX environment and the equipment is considered as equipment intended for normal environment.

20.5 Complaints policy

In cases where the Buyer invites the Seller in writing to repair the equipment and the causes of the failure are not known in advance, or it is not possible to determine which party will bear the cost of the repair, the Seller may require the Buyer to make a deposit for the anticipated repair. The claim sent by the Buyer must include photographic documentation of the claimed part of the equipment or defect. In the event that, upon the Seller's arrival, the Seller is proven to be at fault, the Seller shall issue a credit note to the Buyer and refund any amount paid to the Buyer, or partial refund in cases where both parties have agreed on this procedure.

20.5.1 Conveyor performance

In case the delivered conveyor after installation at the end customer shows a low transport performance (min. 15% less) or a high transport performance (min. 20% more) compared to the value specified in the purchase contract or confirmed order, the Seller will adjust the value of the transport performance at his expense to the contractually agreed performance within the limit of - 15% / + 20%.

20.5.2 Electric transmission (gearbox + motor)

Immediately after the equipment is put into operation, it is the responsibility of the end user or purchaser to measure the motor current and check the motor label values. If the motor shows a current draw 10 % higher than the rated motor current, it is the end user's or buyer's responsibility to immediately take the equipment out of service and immediately inform the seller of this fact. In this case, the seller will arrange for the remedy (replacement of the motor, electric gearbox) at his own expense. If the motor is burnt out due to overheating or due to the conveyor motor operating at inrush currents higher than 10% above the rated current, the seller will ensure the replacement of the motor or the electric gearbox, if necessary, at 100% of the total cost before the replacement.

The Buyer further agrees to set the current protection for the conveyor's electrical transmission to the actual current drawn when the conveyor is fully loaded. If the conveyor is to be operated by a frequency converter provided by the purchaser, the purchaser shall design the electrical output of the converter to be at least one step higher than the motor output of the electric gearbox.

20.6 Warranty and post-warranty service

The need for service work, warranty repairs, etc. is requested from RATAJ a.s. at the above address.

21 List of operational documentation

The following documentation is supplied with the conveyor:

- delivery note and handover report
- instructions for use and maintenance of conveyor type RLN - ATEX
- instructions for use and maintenance of level sensors - ATEX
- instructions for installation, operation and maintenance of the ATEX gearbox
- CE - Declaration of Conformity for conveyor type RLN - ATEX
- Drawing documentation in the scope - dimensional drawing, diagram