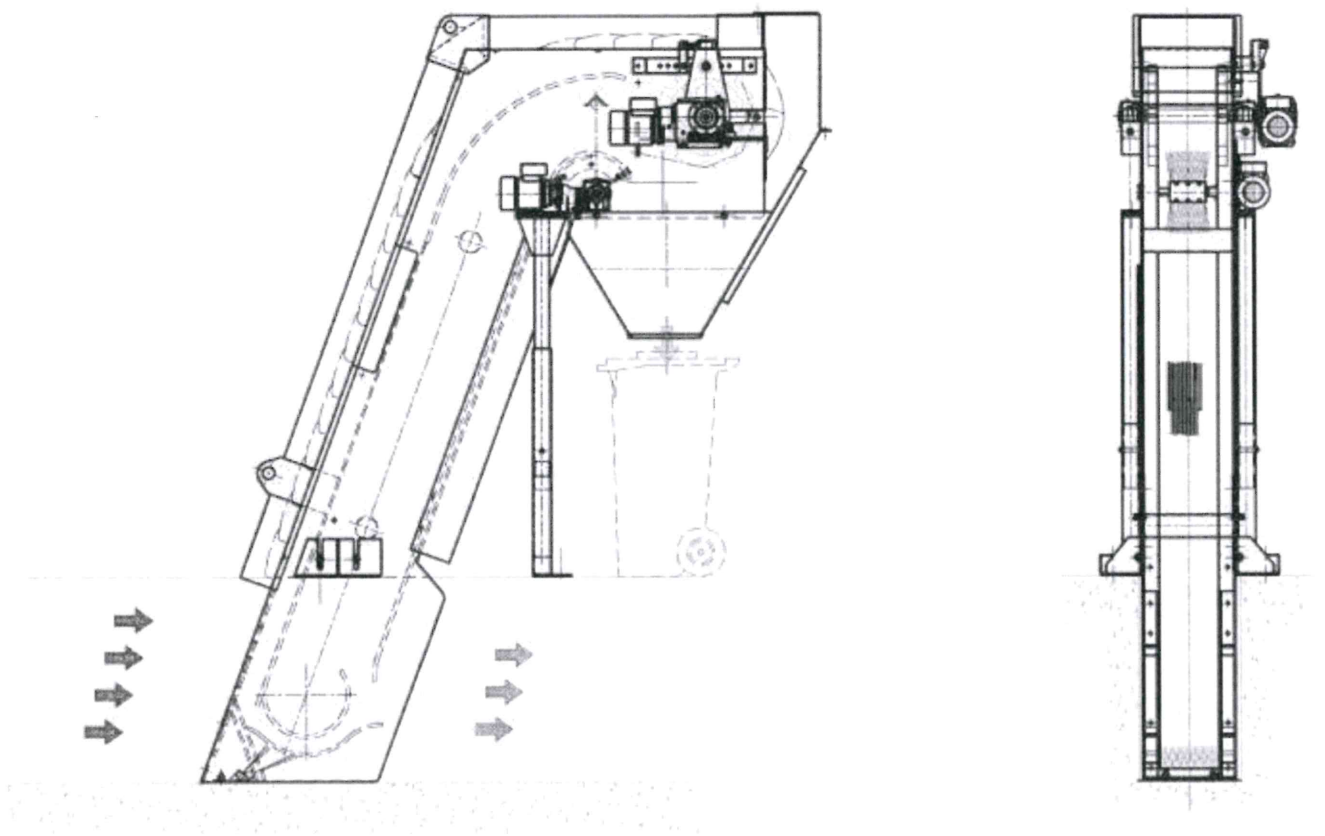


TECHNICAL
DELIVERY
SPECIFICATIONS

SELF-CLEANING SCREEN
(SCC, SCC-G)
SELF-CLEANING COARSE SCREEN
(SCC-H, SCC-HG)



Fontana®

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Equipment for waste water treatment plants

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These technical specifications (hereinafter TS) form an integral part of the delivery of self-cleaning screen of types SCC, SCC-G, SCC-H, SCC-HG, as manufactured by FONTANA R, s. r. o.

I. CHARACTERISTICS

1. Self-cleaning screen (SCC, SCC-G, SCC-H, SCC-HG) (continuous filtration belt) uses moving bar grating (continuous filtration belt) that lifts captured screenings from open canal.

SCC – self-cleaning screen with width below 1200 mm

SCC-G - self-cleaning screen “giant“ with width 1300 to 2000 mm

SCC-H – self-cleaning coarse screen with width below 1200 mm

SCC-HG - self-cleaning coarse screen “giant“ with width 1300 to 2000 mm

Self-cleaning screen (SCC, SCC-G) has screen slot width below 15 mm

Self-cleaning coarse screen (SCC-H, SCC-HG) has screen slot width 20 mm to 50 mm

II. IN GENERAL

2. Product description

The screen consists mainly of following parts: frame, support, filtration belt (e.g. bar grating), drive for filtration belt, possibly chain with cover, discharge chute, bottom cover of filtration belt, sealing set, bottom brush and rotary brush with independent drive.

The screen can be also equipped with:

- washing of screenings or of filtration belt from inner side, above the discharge chute,
- thermal insulation and heating unit that provide for fully automatic operation of the equipment even at low temperatures.

Self-cleaning coarse screen (SCC-H, SCC-HG) is not equipped with rotary brush, nor washing equipment.

Supporting frame is welded of steel thick sheets and profile bars. Anchoring support or bracket is connected to the frame by means of screw connections that provide for the fixation to canal head. Continuous filtration travelling belt called also bar grating is placed in the frame. The belt consists of individual rakes connected by horizontal connecting bars, terminated by guide pulleys and lock rings. The rakes are plastic elements of specific shape that ensures the self-cleaning effect.

Belt pulleys are positioned on guide rails of the frame and run over the sprockets of drive shaft.

The screen as a whole is installed in an open canal and is sealed with its vertical walls by means of plastic profiles.

The shaft is driven directly by an electric gearbox or via a chain transmission. The bar grating can be adjusted and tensioned thanks to sliding fit of shaft bearings. The drive for filtration belt is protected against overloading by means of electro-mechanical system with emergency limit switch.

The self-cleaning screen is delivered in following basic types that are suitable for various canal widths (B), canal depths (H) and required height of lower edge of discharge chute above canal (floor) V_o , or for the cases when water flows in pipeline:

- SCC-M, SCC-GM – frame with anchorage;
- SCC-V, SCC-GV – frame with support;
- SCC-VM, SCC-GVM – frame with anchorage and support;
- SCC-KM, SCC-KVM – screen with metal canal or anchorage and support;
- SCC-HV – frame with anchorage
- SCC-HVM, SCC-HGVM – frame with anchorage and support.

SCC a SCC-G types differ from SCC-H, SCC-HG types in screen slot width that is achieved by an insertion of rings of various thickness between the rakes on continuous belt.

3. Utilization

Self-cleaning screen (SCC, SCC-G) is suitable for the installation in waste water treatment plants and it is mainly included in the entry objects of mechanical pre-cleaning, usually downstream a coarse screen. It is installed in inlet canals to collect fine screenings. But it can be used also in meat processing and chemical industries, in tanneries, breweries, potato processing plants, water purification plants, pumping stations, power plants, heating plants etc.

Specific application should be discussed in advance with the manufacturer.

Self-cleaning coarse screen (SCC-H, SCC-HG) is installed in waste water treatment plant downstream a grit chamber; it collect coarse solids that are included in screenings. It protects fine screens (SCC) or pump. It is not intended for the collection of oversized objects, stones etc.

4. Operating conditions

The screen is intended first of all for indoor use, but with special accessories it can be used also outdoors. In order to prevent the freezing of screenings onto filtration belt and ice formation, the screen should be operated when ambient temperature is 0°C at least and maximal temperature of waste water is below $+50^{\circ}\text{C}$. If the temperature of the water to be treated exceeds $+50^{\circ}$, or when the screen should be in used in chemical industry or for the cleaning of aggressive media, possibly of water with high content of strongly abrasive solid substances, its operation should be also consulted with its

manufacturer. Extensive volume of incoming grit causes greater wear of self-cleaning screen, especially the belt.

If the screen should be operated at ambient temperatures 0°C to -20°C, it should be heated - **see art. 26.**

The operation in winter requires covering the canals upstream and downstream the screen, so that the loss of thermal energy contained in the waste water is minimized.

The manufacturer does not offer the covering for canals.

5. Product protection

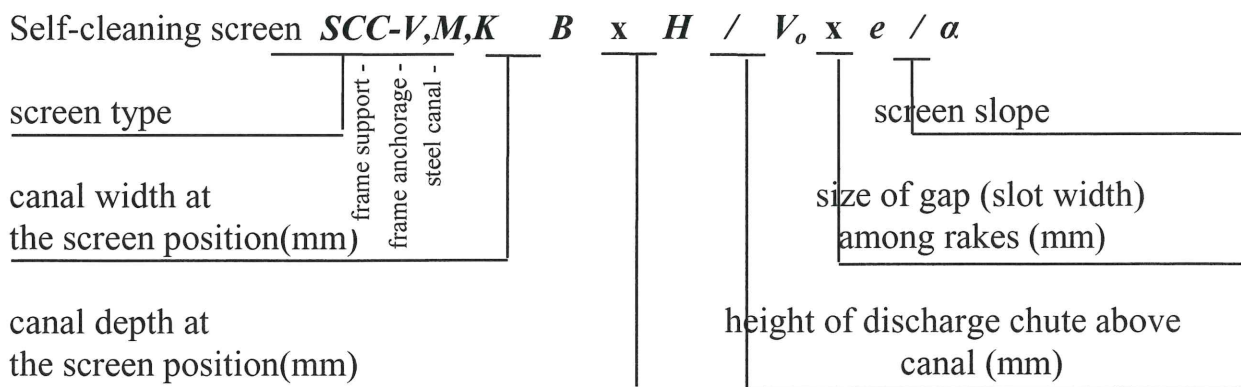
If waste water contains such screenings as wood, stones, metal parts etc. bigger than 80 mm, it is necessary to install upstream equipment that is capable to remove such a coarse material (e.g. hand skimmed screen with slot width of 80 mm or self-cleaning coarse screen).

In the case of a combined sewer, when torrential rains bring a considerable volume of gravel and grit, the manufacturer recommends to install an equipment for extraction of gravel and grit upstream the screen.

Protection for coarse types (SCC-H, SCC-HG) is realized in similar way, it is important to install a grit chamber upstream the screen.

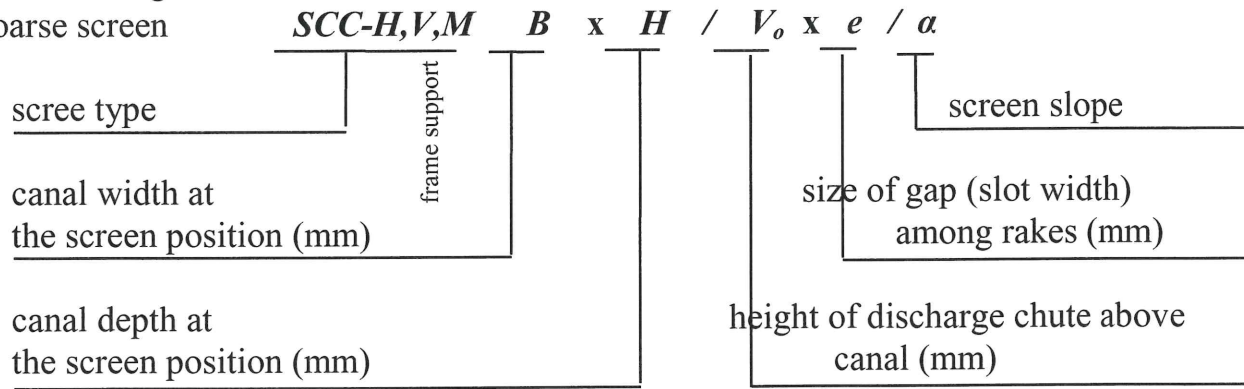
6. Product identification

Within technical documentation, in the orders of spare parts or on other occasions, the name, type and nominal dimensions of the screen are given in following form:



Note: The screens of big range (with B above 1300 mm) are named SCC-G, other symbols remain the same.

Self-cleaning
coarse screen



Note: The screens for canals wider than 1300 mm are marked SCC-HG.....

7. Functional properties, technical parameters

The screen collects solid substances on moving bar grating - filtration belt- and moves them from water to container, press or conveyor for further disposal.

Main advantage of the system with travelling filtration belt is that the screenings are taken from water and so they do not form an obstacle for water passage.

Special design of rakes (shaped belt elements) ensures the separation of screenings from the bar grating, and together with their specific motion within the upper part of the screen generate so-called self-cleaning effect of the belt.

Rotary brush is used for further cleaning of the belt, it removes residual screenings of fibrous nature from the belt.

Width of SCC and SCC-H is adaptable to canal dimensions, namely in width range from 350 to 2000 mm and depth range from 400 to 8000 mm. The screen with width larger than 1300 mm are designated as SCC-G or SCC-HG.

Standard series of SCC screens is equipped with filtration belts with slot width $e = 1; 3; 6; 10$ and 15 mm. In the case of SCC-G series, the slot width can be $e = 3, 6$ and 10 mm. SCC-H and SCC-HG series use existing rakes and the slot width is extended to $20, 30, 40$ and 50 mm

Following slopes of screen frames are offered for SCC and SCC-H: $60^\circ, 70^\circ, 75^\circ, 80^\circ, 85^\circ, 90^\circ$; in the case of SCC-G and SCC-HG they are 75° and 85° .

Power input of drive is offeren in the range $0.24 \div 1.35$ kW/400V/50Hz; power input of heating $0.8 \div 3$ kW/230V/50Hz.

Specific technical parameters depend on screen size and are described in respective quotation.

8. The materials used

In standard version, the frame, supports, anchorage and holder of bottom brush are made of carbon steel, metalized with zinc and painted with protective coat.

The shafts of drive and rotary brush, connecting rods and elements of filtration frame, discharge chute, screen cover, possibly heating panels are made of stainless chromium nickel steel.

Filtration elements (rakes), connecting elements of the belt and rollers are made of plastics, same as scraper, rotary brushes and chain covers.

Depending on the type of frame, the sprockets are made of carbon or stainless steel, belt drive wheels are made of grey cast iron.

On customer's request it is possible to use other materials, e.g. to manufacture the frame of stainless chromium nickel steel or another sort of steel.

9. Scope of delivery

Standard delivery includes: screen frame with built-in filtration belt and electric drive, support or anchorage (according to the type of equipment being delivered), rotary brush with independent drive, equipment protecting drives against overloading (emergency switches), discharge chute, bottom cover of frame, sealing at canal bottom and vertical walls, control switchboard for operation control (separate item of price) and level probe of EHS.

In addition to that the delivery may include:

- Washing equipment with nozzles and solenoid valve, prepared to be connected to pressure water supply (0.3 ÷ 0.6 MPa, 0.8 l/s⁻¹).
- Thermal insulation or heating unit (see art. 28).
- Another way to control the automatic operation of the screen - according to water level. E.g. ultrasound probe or equipment measuring the level difference upstream and downstream the screen etc.
- Divided screen frame with flange connection for the cases with insufficient space for installation.

Self-cleaning coarse screen (SCC-H, SCC-HG) usually is not equipped with rotary brush, nor washing equipment

10. Safety

The persons realising operation, maintenance, inspection and assembly must have appropriate qualification or training for such work.



Travelling filtration belt represents a danger place as it is not covered (with the exception of heated variants). Any interventions in this part of the equipment can be carried out only when the drive is switched off.

The screen is protected against dangerous contact voltage by grounding screws fixed to its frame.

Repairs and maintenance of equipment, possibly any interventions in its construction, can be performed only when the equipment is stopped and secured against accidental start-up.

Restarting of the equipment is possible only when all safety covers are in their places, if delivered.

11. Product data

The product bears a nameplate that is located on a visible place. The plate indicates type, serial number, year of manufacture and weight of the product.

III. THE TESTING

12. FONTANA R verifies functionality of the equipment. Inspection consists of a visual assessment of the entire product, including welds and surface protection, and of the measurement of dimensions, in order to prove that the product complies with the agreed contract.

Functional test in workshop consist in the testing of operation of completely assembled screen and in the measuring the load of electric motors.

When agreed, FONTANA R also realizes commissioning of the screen, belt adjustment and also staff training directly at operator's precinct. If the manufacturer is responsible for the installation, these activities are included in the price.

IV. THE DELIVERY AND ACCEPTANCE

13. The customer's responsibility is to arrange for necessary construction work on canal, namely according to design documents or drafts by FONTANA R and sufficiently in advance of the relevant date of installation. Simultaneously it is necessary to arrange for and prepare an access road to the site of installation and

arrange for lifting devices to be used for handling the screen within the installation. In buildings, it is necessary to install a beam above the canal to be used for hanging the hoist.

14. The delivery

Then, the delivery of screen follows based on an individual agreement with the customer. The screen is usually delivered assembled. But vertical support, discharge chute and bottom cover for filtration belt are removed and included separately in the delivery. The degree of completion determines the range of accessories delivered and also the way of transport.

For space reasons or in the cases, when lifting equipment cannot be used for screen installation, the frame is divided into two parts and whole equipment is disassembled in manufacturer's workshop. In the course of installation, the screen is assembled in one whole.

15. Acceptance

On customer's request, the product can be collected directly at manufacturer's precinct before shipment.

If the contract includes also transportation of product to the specific destination, the manufacturer is responsible for completeness of the delivery throughout the transport. Acceptance of equipment is carried out as unloading of all product parts from vehicle and subsequent signing of delivery note.

If Fontana is responsible for installation, the customer takes over the equipment only after installation completion, staff training and putting into operation. Acceptance of delivery is confirmed by signing the „Completion certificate“.

16. Accompanying documentation

Includes:

- ◆ technical delivery specifications
- ◆ assembly drawing
- ◆ wiring diagram for el. switchboard
- ◆ certificate of product quality
- ◆ declaration of conformity
- ◆ accompanying documentation by manufacturers of gearboxes

17. Guarantees

24 months guarantee is provided for the product that commences on the date of shipment, unless agreed otherwise in the contract.

In the case of *wear components*, the guarantee period is *12 months*.

Wear components:

- plastic components of filtration belt
- snap rings and washers
- roller chains - if included in the delivery (for screen width above 900 mm)
- brushes – bottom and rotary
- safety limit switch
- control panel components

The terms for different guarantee periods are given in the contract and in the quotation for specific type of equipment. The price of the product is modified in the case of prolonged guarantee period.

The guarantee provided by the manufacturer is conditioned by following facts:

- installation of the equipment was carried out in a professional way in its mechanical and electrical part; authorization and qualification of installer is documented;
- the screen is not overloaded - permitted volume of the waste water flowing in is complied with (as given in quotation, resp. contract);
- the screen is operated in automatic mode as described above (mainly interval running);
- the screen is protected against possible mechanical damage (art. 5), esp. by stones and grit.

Above mentioned guarantee applies only to the screens operated in compliance with delivery documentation. The manufacturer does not provide guarantee for the damages caused demonstrably by inappropriate handling or improper storage by customer.

If the delivery of screen does not include also a control switchboard and electrical installation in the object does not include equivalent protection system (function of emergency switch), the screen manufacturer is not responsible for possible damage to screen resulting from its overloading.

V. PACKAGING, TRANSPORTATION AND STORAGE

18. Packaging

The screen is delivered unpacked. Electric gearboxes are protected by PE film. Electrical switchboards are usually transported in the cabin of the transport vehicle. Possible requirements for packaging can be arranged with the manufacturer.

19. Transportation



Transportation of the equipment must be carried out in a professional way. Chains, resp. ropes used for handling the product must be hung safely.

The equipment released from lifting attachment could cause personal injury or material damage.

Individual parts are loaded on a transport vehicle and secured against displacement and tilting. For foreign supplies, the products can be anchored to a transportation frame (nonreturnable - price item).

Transportation is arranged for on the basis of mutual agreement at the expense of the customer or according to contract and written offer.

20. Storage

The screen and its dismantled parts should be stored on a flat, dry surface and protected against damage and weather conditions, as they are not in their operating positions. Customer is responsible for proper storage and delivery completeness in the course of storage.

VI. SPECIAL REQUIREMENTS

21a. The customer is responsible for the preparing of necessary constructions. Dimensions of the canal are defined in respective project or in the design by Fontana. According to screen type, the tolerance of canal width and depth at the screen should be ± 5 mm.

It is suitable to install a beam perpendicularly above the canal axis to be used for block and tackle, possibly for cable or chain hoist. If such a beam cannot be installed, another suitable method of installation should be chosen.

21b. Do not grind, weld or finish in the vicinity of stainless steel surfaces, as these particles tend to deposit on stainless steel surfaces and subsequently they cause corrosion.

Common structural carbon steel could also represent a source of corrosion, when it comes in contact with stainless steel. That's why finished products should not get in contact with such materials.

If the stainless steel surfaces are damaged or contaminated during transport, handling or directly on the site, it is necessary to re-treat them.

Traces of lime and cement can be removed by diluted phosphoric acid. Then the surface should be rinsed with clean, preferably distilled water. **Hydrochloric acid must not be used in any case.**

Dust particles, wood chips, etc. could be removed with using of conventional household detergents.

If corrosion does occur, it is necessary to use special mordants and pastes and to follow the manufacturer's instructions.

Detergent solution is usually sufficient for removing fingerprints or grease. Strong contamination with oil or grease can be removed by means of alcohol, such as ethanol or acetone with using a clean cloth.

Heavily soiled surfaces can be cleaned with preparations designed for chromium, resp. with polishing pastes, with caution.

Following detergents must not be used for cleaning: preparations containing chlorides and hydrochloric acid, bleaching agents and silver cleaning preparations.

Suitable cleaning tools include damp clothes, leather, cleaning sponges (iron-free) and soft nylon brushes.

Course sponges, steel wool or wire brushes must not be used in any case.

Also chlorine-based disinfectants must not be used.

What causes damage to stainless steel:

- welding and grinding in their vicinity
- fresh construction and plaster mixtures in the course of drying
- contact with common carbon steel
- coastal atmosphere and salty sands
- contact with salt water during thaw
- industrial waste gases and polluted air

VII. OPERATION

22. Operation

Design of the screen provides for its continuous operation. Considering low rate of belt travel, the wear is very slow under optimal conditions. More rapid wear indicates the presence of abrasive substances. In spite of that we recommend to operate the equipment intermittently, especially at low concentrations of insoluble solids in waste water being treated. If the delivery includes also RPA switchboard, it is possible to set the operation mode according to the time program, combined with water level upstream the screen.

The time program for automatic operation of the screen depends mainly on equipment size and quantity of screenings taken with waste water. Running time of the screen should be selected so that whole continuous filtration belt runs through after its automatic start-up and the screenings caught on filtration belt are tilted out. Pause in operation should be set according to the volume of waste water and water level. The pause in screen running is adjustable arbitrarily (by skilled technician), usually it lasts from 30 minutes to 1 hour. If water level upstream the screen raises excessively, level switch takes over the control that is located in inlet canal upstream the screen. The switchboard is fitted also with manual control with continuous operation used in the case of automatics failure. However, continuous operation of the screen should be limited to *shortest possible time period* in order to prevent premature wear of moving, especially plastic components.

If the screen was out of operation for several days it is necessary to check whether solid substances and grit are not deposited on canal bottom, upstream the screen. All deposited material should be removed before the screen can be started-up, unless the belt could be overloaded and fail.

If the filtration belt is overloaded or blocked, motor arm swings out, emergency switch opens and electric switchboard ensure drive shut-down, so that further operation is prevented.



If any intervention in equipment is necessary, the equipment must be switched off and secured against accidental start.



Never put your hands or other objects into the running equipment.

23. Operation, lubrication, maintenance, service

SCC does not require any attendance (with the exception of lubrication), but require (preventive) inspection.

Rotary brush can be cleaned after turning the shaft handle of turnover bar (turning clockwise and anticlockwise approx. 3/4 of turn). **Recommended interval is at least twice a week.**

In the course of operation, smooth running of bar grating should be monitored and also the condition of pulleys and lock rings on all connecting rods, the condition of sealing elements, the tensioning of belt and drive chain (after cover removal), the condition of gearboxes (possible leakage), the state of rotary brush and the tightening of all screw connections. If belt dragging is observed or if the belt deviates it is necessary to stop the screen immediately and remove the cause promptly.

The filtration belt should be inspected visually, especially possible damage to plastic parts, e.g. the rakes and belt guide pulleys. It is also necessary to check lock rings (Seeger) installed on connecting rod ends. They could be broken or missing.

The belt is properly tensioned, when it is slack (approx. 100 mm – according to frame slope) in lower part below the frame, when measured perpendicularly to frame side. The tensioning and smooth running of filtration belt are usually set by the manufacturer after the screen assembly and in the course of test run, so no further adjustments are necessary.

The running of filtration belt should be smooth, pulleys should slide along the slideway and sufficient clearance should be between rakes, pulleys and sides (sum of spaces when compressed should be 2 to 15 mm). On the contrary, their excessive compression induces an axial pressure, which can result in belt corrugation and increased passive resistance.

It is recommended to charge manufacturer's service technicians with above described operations related to the belt.

Electric gearboxes should be examined according to the requirements of specific manufacturers as given in attached documents. It is dealing especially with lubricant condition, temperature of cases and noisiness. Oil loss is usually caused by a leakage in lower part of gearbox case.

Condition of rotary brush could be checked through sight holes in frame head or in the sidewall of discharge chute (for the screens manufactured before 1999 it is necessary to remove the discharge chute).

Washing intensity (e.g. the belt coverage) is inspected on the screens with installed spraying equipment.

The inspections of above described screen parts are necessary for long-term operation of self-cleaning screen with low maintenance costs.

Frequency of screen maintenance should be adjusted according to the nature of screen operation and load. The inspections could reveal defects caused by wear and tear or adverse external influences (e. g. overloading by screenings and rigid objects). Below given paragraphs describe common failures and give instructions for repairs.

- **Tensioning of linked chains** driving the belt shaft (for SCC with width above $B = 800$ mm) is done using set screws that lift the bracket (carrier) of gearbox. Sag of the chain with no load should be 15 mm. Its tensioning should be adjusted firstly after 100 hours of operation, then once every three months.
- **Tensioning of filtration belt** (correct tension is adjusted by manufacturer) should be done only in special cases. When replacing the rakes (short-term release of the belt) and when the belt is misaligned, as described below.
- **Replacement** of damaged, possibly missing **lock rings** on the ends of connecting rods. Small solid particles (e.g. grit) usually cause this failure as they get jammed among rake hubs, possibly also ice. In this way, the belt width increases and also axial force and pressure applied to the lock ring, so it distorts or jumps off. Special pliers are used for lock rings.
- **Missing pulley** is a result of missing lock ring. The belt should be stopped immediately and missing pulleys should be replaced together with washers and lock rings.
- **Narrowing of filtration belt** (when measured between belt sides) - can occur when waste water being treated contains abrasive contaminants. It is caused by gradual abrasion of sides of rake hubs, which results in the narrowing of individual belt elements. Subsequently the pulleys could move into vacant space and leave the slideway. Free rods get directly onto the slideway and the gear of drive wheel, and so the lock rings are pushed out. It is necessary to disassembly the belt immediately and to add one or more rows of rakes along the belt circumference so that the pulleys get back onto the slideway.
- **Widening of filtration belt** is opposite problem and it is caused by small solid particles. It is necessary to remove one row of rakes along the belt circumference a so to narrow the belt.
- **Inclined (misaligned) running of belt** – the belt runs (pulls) to one side of the screen. It could be caused by screen frame incorrectly fastened in the course of installation (sloping bottom). Frame walls deviate from vertical and horizontal axes. The screen should be removed, canal walls repaired and the screen again set in correct position. The belt can be aligned after loosening the bearings of main shaft and using the tensioning bolts guide tensioners (even repeatedly) to achieve smooth running of the belt within the frame.
- **Broken or missing rake** is usually a result of mechanical damage by rigid object. It is not necessary to make repair when a few rakes are broken, filtering ability of the belt is not endangered by this. As soon as approx. 10 rakes are damaged, replacement is recommended, see art. Disassembly of the belt.
- **Jerky motion of the belt** could occur after screen shutdown as the belt has dried too much. Use water to wash the filtration belt. Jerky motion of the belt could be also caused by defective bearing on main shaft or on half-axles in the SCC-G variant. Rolling bearings have conical bushings and are seated in bearing housings. They can be replaced in standard way, e.g. it is necessary to loosen the nut and bushing washer and then pull it off.

- SCC is protected against overloading by **emergency switches** that stop the operation of screen drive. They are factory-set at 3-5 mm (distance of microswitch roller from disconnecting plate). In the course of test run this clearance can be adjusted by shifting the microswitch (M5 screws). It is necessary to remove the cause of overloading (usually an object jammed in the belt) and put the switch back to standby position. *The machine is restarted by switching off and on the main switch in RPA switchboard.*

Fontana also offers service and spare parts in full scope of the delivery, if required. It is recommended to realize inspection and maintenance work at least in one-year cycles in order to avoid major repairs.

⚠ ATTENTION!!

☛ If the self-cleaning screen is installed within integrated systems IHP, IHPES or IHPELS, service and maintenance work is not necessary. But it is conditioned by service intervention by FONTANA staff at least once a year. Valid in CR after January 2, 2013.



When carrying out maintenance and service work, the machine must be switched off and secured against accidental start-up preferably by lockable main switch (see also ČSN 260003 and ISO 7149).

Lubrication



Bearing housings should be filled with LT2/3 grease once every 6 months, namely with using of pressure lubricator.



The chains (for screen width above 900 mm) are lubricated with LT2/3 grease once every 6 months.

- ◆ The lubricants meeting following specifications are equivalents for foreign customers:
 - DIN 51 502
 - K 2/3G-30
 - ISO 6743-9
 - L-X-CCHA-2/3
- ◆ The gearboxes are filled with synthetic oil that does not require changing. It is designed for whole service life of the gearbox - e.g. 4-5 years or 20 000 operating hours.

The volumes and specifications of synthetic oil can be found in enclosed documentation by NORD company.

24. Installation



Installation of the equipment must be carried out in a professional way. Chains, resp. ropes must be hung safely.

The equipment released from lifting attachment could cause personal injury or material damage.

The screen is usually installed with using of a truck crane or another lifting equipment. If it should be installed inside a building, a beam should be installed perpendicularly to canal axis above future screen position. Screen frame with filtration belt and drive is seated into prepared canal, delivered support or anchorage is fitted and by means of screw connections the equipment is set in appropriate position so that the upper plate of frame is horizontal in all directions. The height of screen support should be adjusted according to real canal depth H.

If spatial conditions do not allow for the installation of screen in assembled state, also installation in steps is possible. First of all, the screen frame is seated and fixed (it can be divided into several parts). Subsequently filtration belt is installed and other parts of the screen. It is advisable to charge the technicians of FONTANA R with such installation in steps.

In most cases, the self-cleaning screen is anchored with using of steel plugs WH KOTE FIXI $\varnothing 18$. Respective holes for such steel plugs are drilled during the installation according to openings in screen anchorage. Larger screens are anchored to canal bottom, with using the hole in lower part of the frame.

When the screen is finally seated, all anchoring joints are tightened so that the screen is firmly secured to the trough or to another stable structure. Plastic sealing strips are located precisely on canal walls, discharge chute is installed and bottom cover for filtration belt. Proper direction of belt travelling, as indicated by arrows, is verified by short switching on of the drive (for 1 ÷ 2 sec.). The belt should travel from the bottom upwards and rotary brush should rotate clockwise.

The screen is equipped with one or two emergency limit (protective) switch(es), installed near electrical gearboxes. These switches should be connected via control switchboard to electrical system.



Electrical connection can be only carried out by qualified electricians and in accordance with local regulations. The equipment should be grounded (see grounding screw).

Mains voltage must correspond to the voltage stated on the nameplate.

Before the equipment may be put into operation, authorized representative of purchaser or installer should issue an inspection report for electrical part (separate item of price).

In production, the thermostat of heated variants is usually set at 0°C, as the temperature at which the circuit of heating cable is powered. Specific setting of the thermostat should be adapted to local conditions (ambient temperature, nature of wind etc.).

25. Disassembly of the belt

The belt is usually disassembled when it is necessary to replace damaged or missing rakes. A damage to rake may occur because of various reasons, when the rakes get jammed with wire or when they come in contact with large piece of rigid material (gravel, stone etc.), wooden board or block, ice or grit layer.

Use following procedure:

- ◆ Stop the belt so that the place to be repaired is visible
- ◆ Use the main switch to switch the drive off
- ◆ Remove the plugs from the mounting openings
- ◆ Loosen the belt with using of fixtures, reverse run of filtration belt, possibly by loosening the tensioners (M20, M24 nuts)
- ◆ Release the lock ring on rods with damaged rakes (2 pieces at least)
- ◆ Remove washers and pulleys
- ◆ Insert a pushing rod and simultaneously pull out the original rod up to the position of rake to be replaced
- ◆ Remove damaged rake and simultaneously put on a new rake
- ◆ Return connecting rod to its original position
- ◆ Install all removed components, pay attention to correct positions of lock rings
- ◆ The same procedure is used also for next rod that bears second part of damaged rake
- ◆ Return the belt to its original position

26. Heating and operation at temperatures below zero

It is more reliable and simpler from maintenance and attendance point of view, when the screen is operated in a heated space (a building with temperatures above zero).

If the product is equipped with the covers with installed heating units, the screen can be operated down to the temperatures of -20°C. **Simultaneously it is necessary to cover the channel upstream and downstream the screen hermetically with plates** (concrete, wooden or steel plates with the length of 3m upstream and 1m downstream the screen) in winter period so as to prevent lowering the temperature to maximum possible extent as caused by continuously inflowing wastewater. The installation of

gratings is less suitable from the point of thermal insulation, as they have to be additionally covered.

Mainly following parameters are considered when selecting the power input of heaters:

- ◆ screen dimensions, especially frame width and height of discharge chute above upper edge of canal (V_o),
- ◆ waste water flow rate and temperature that could significantly increase the temperature in the canal,
- ◆ mode of equipment operation (continuous inlet of waste water or intermittent pumping from cofferdam)
- ◆ local conditions in given locality (cooling effect of wind, altitude, etc.)

According to screen dimensions, the heaters are offered with different power inputs (approx. 105-2000 W) for single-phase power supply 230 V; 50 Hz. The operation of heating system is controlled by outdoor thermostats that are included in the delivery of control switchboard. The thermostats should be located in close vicinity of the screen and fastened by screws under the box lid (e.g. onto a wall, shelter construction, switchboard bracket etc.) and connected to electrical switchboard of corresponding type. When the temperature on the thermostat is set (e.g. 0°C), the heating system is activated in automatic operation. If outdoor temperature is lower than the set temperature, heating system is switched on, at higher temperatures it is switched off automatically. The system for turning the heating on/off is functional only within automatic operation of the screen. All above described functions are controlled (in addition to scheduled programme) by a switchboard of RPA type, as delivered by Fontana. Such a switchboard is equipped on customer's request, including protective elements.

Necessary measures to be taken by purchaser or operator for the operation at below-zero temperatures:

When the temperature drops below -10°C , the manufacturer defines special conditions for screen operation and it is necessary to fulfil further requirements:

- ⇒ covering the canal 5-6 m upstream the screen and 2 m downstream the screen by watertight panels (wood, textiles). Covering the canal with vertical suspended carpet or rubber down to water level in order to avoid cooling of the channel.
- ⇒ the screen should be operated with sufficient water level in inlet canal, so that lower part of filtration belt is submerged
- ⇒ continuous operation of screen at temperatures under -10°C
- ⇒ addition of further additional heating unit. Such unit is activated manually when temperature is under -10°C - -15°C (e.g. only at night), especially when water is pumped into canal in intervals.

⇒ if the screen is usually operated in continuous operation, with main switch in "man" (manual) position, it is necessary to switch to automatic operation at temperatures below zero. In the course of continuous operation, the heating is not controlled by thermostat, so it continues even at temperatures above zero and in this way plastic parts could be overheated and damaged.

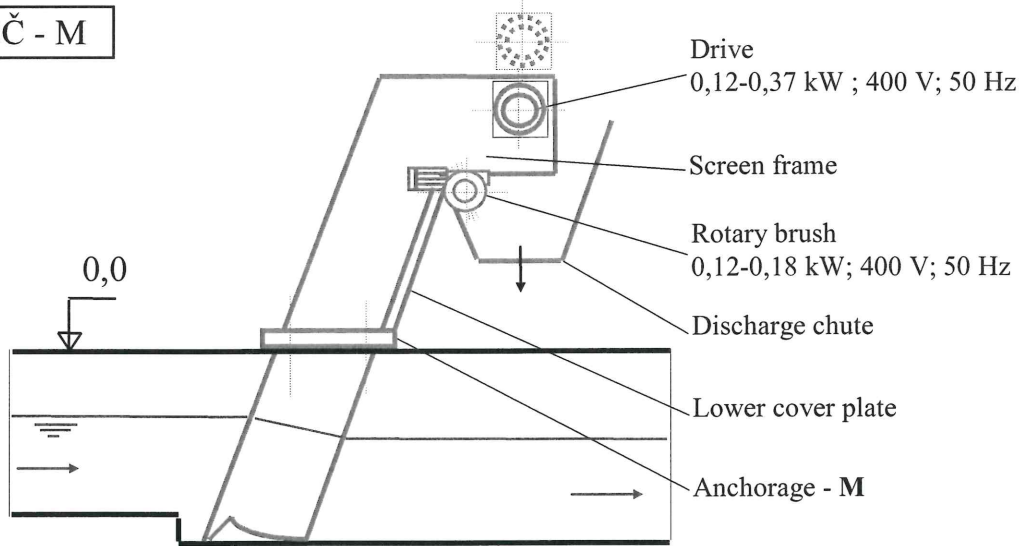
If some of above mentioned requirements could not be met in frosty weather, it is necessary to inspect the screen frequently, possibly to ***shut it down***.

Important notice:

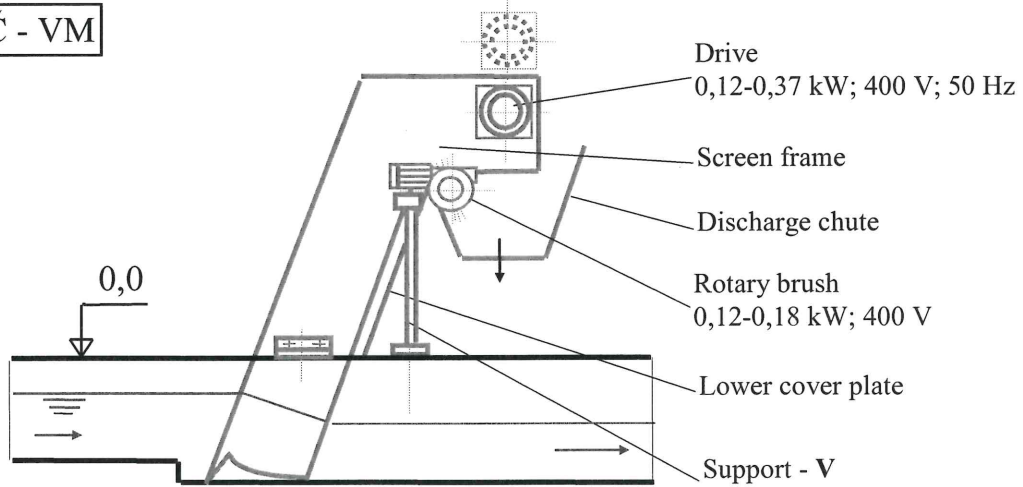
If at below-zero temperatures the heating cannot be operated for any reason, there is a risk of damage to the screens! Freezing of water among individual rakes results in the widening of the belt, increased friction and subsequent jump off of lock rings from connecting rods, possibly bending of drive shaft. If control switchboard of RPA type is installed, the screen is not damaged, but stopped automatically by emergency switch. Before the screen can be again put into operation, it is necessary to warm the belt. It is possible to use warm water or hot air, but maximal temperature of plastic parts should not exceed 40°C. After this intervention, the belt must be freed so that it can be moved as a chain.

VIII. TYPES OF SCC AND SCOPE OF DELIVERY

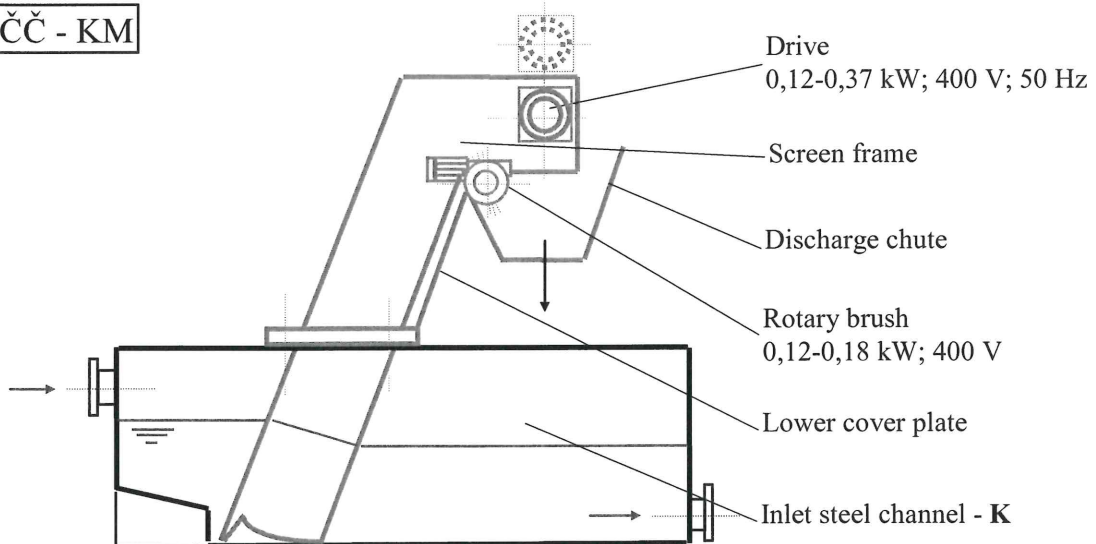
SČČ - M



SČČ - VM



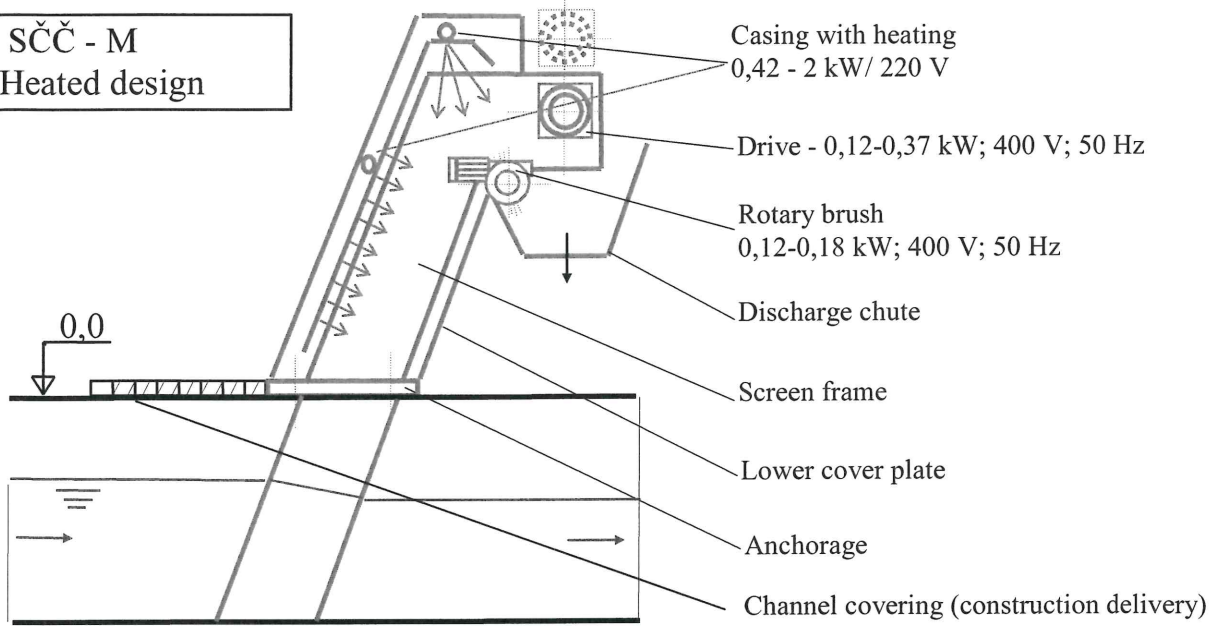
SČČ - KM



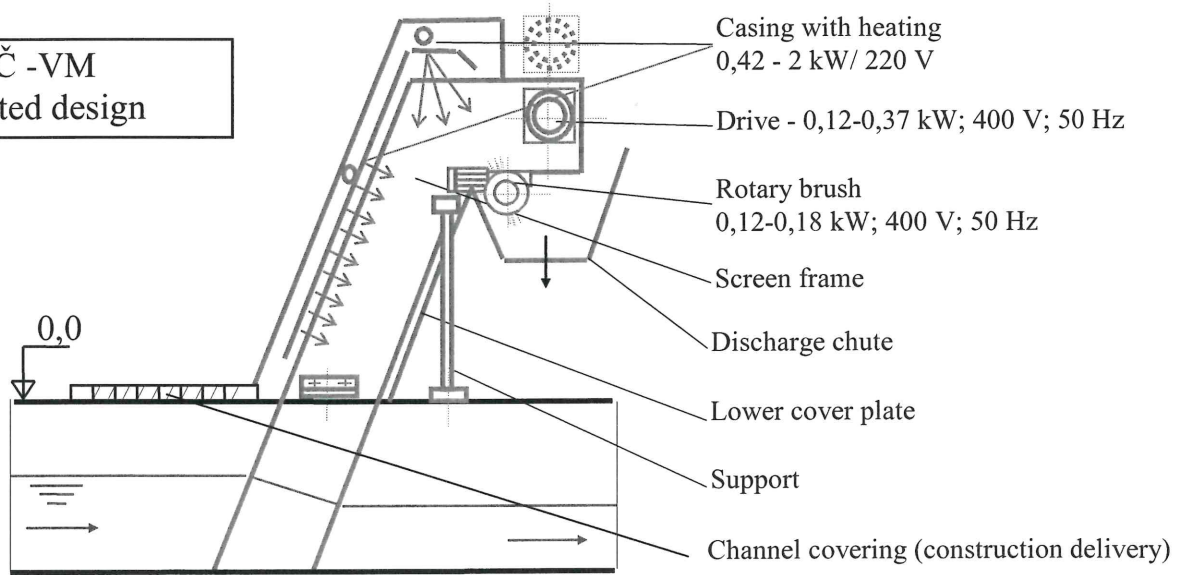
Note.: Producer honor the other voltage and frequency value

MODELS AND TYPES

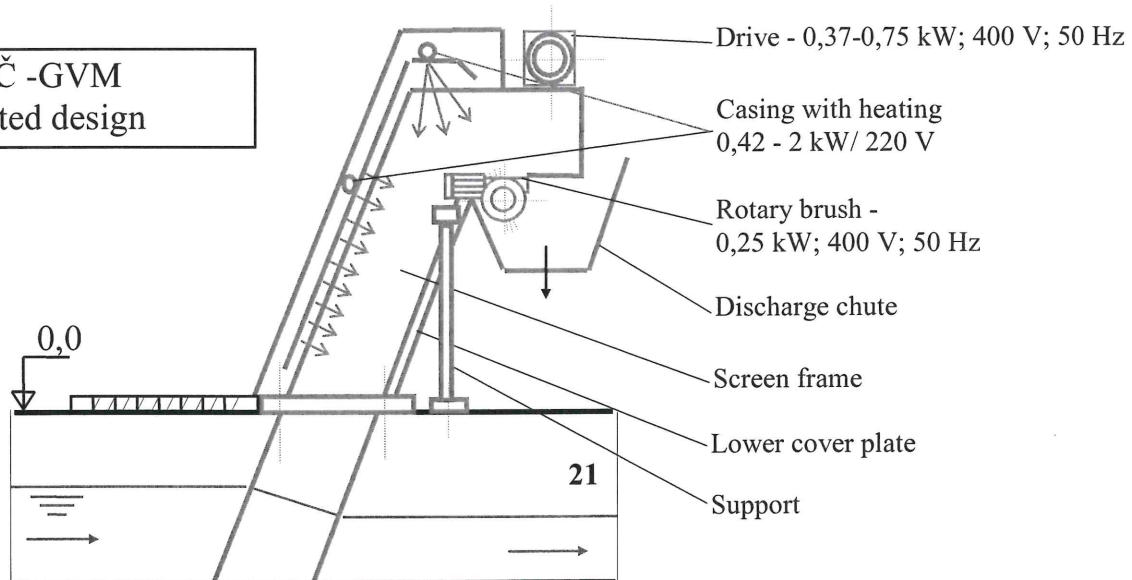
SČČ - M
Heated design



SČČ - VM
Heated design



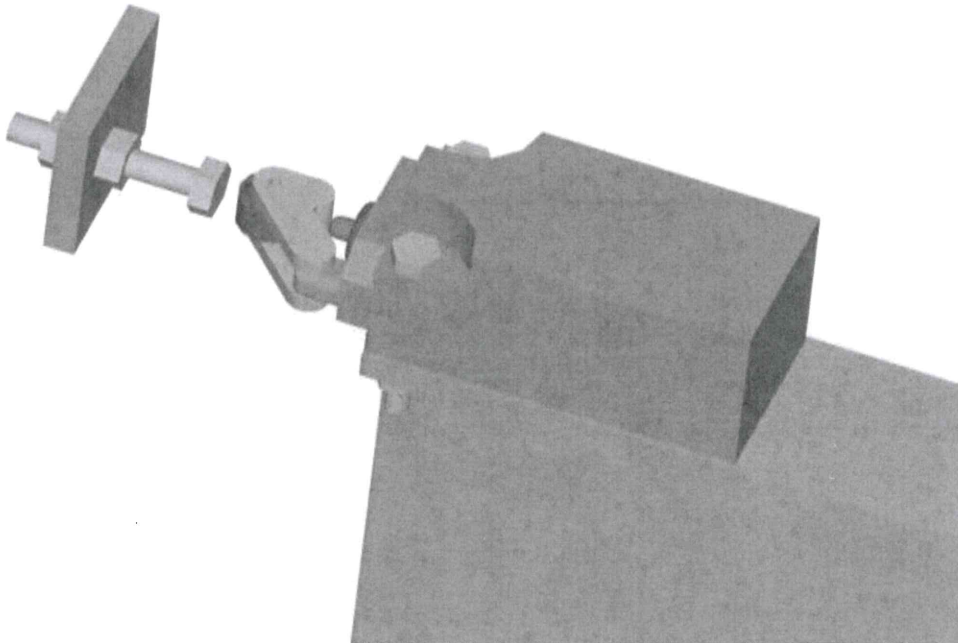
SČČ - GVM
Heated design



IX. CONNECTION OF EMERGENCY MICROSWITCHES FOR MONITORING THE OVERLOAD OF ELECTRICAL GEARBOXES

The distance between microswitch and rest is set by manufacturer.

Electrical connection : microswitch should be installed so that the movement of reaction arm results in the pushing of the plastic pin resp. roller and in circuit interruption with subsequent shut down of machine.



X. APPENDIX – SPECIAL ACCESSORIES

27. Tilting equipment for the screen - SCC - S

Self-cleaning screen also can be equipped with the equipment providing for the screen tilting so that frame bottom is lifted above canal bottom and water can flow below the screen.

The screen is tilted with a manually operated mechanism in the case that it is necessary to remove deposited grit from inlet trough. This mechanism consists of firmly anchored frame, motion screw and hand wheel. If the screen should be tilted, first of all it is necessary to remove discharge chute (loosen and remove 4x M8×12 screw). Certain types of screens (especially for shallower canals with depth below 1500 mm) require releasing the safety side anchorage, namely by loosening and removing of M16 nuts. Afterwards, the screen weight is to be transferred to pivot (by turning the set screws for one turn) and then the screen can be tilted by rotation of hand wheel. The screen can be tilted in the range up to 300 mm (difference between screen bottom and canal bottom).

Further possibility is to lift the screen above canal bottom with using of servodrive. The screen is lifted along additional frame vertically upwards up to the height of approx. 300 mm above bottom.

Such an arrangement is advantageous as the screen is lifted quickly, without the need for dismantling the discharge chute or press shut-down. It is designed as a type solution that meets the demanding requirements of customers.

28. Washing of filtration belt

In addition to rotary brush, the filtration belt can be cleaned also by spraying. It is dealing with an accessory that is used mainly in industry. Either the screenings collected by belt are sprayed or partially washed on inlet side of screen or the belt is cleaned on its inner side as soon as the screenings fall into discharge chute.

Pressure nozzles are used for spraying the belt, installed as a part of input pipeline. Number of nozzles and dimensions of inlet pipeline equipped with solenoid valve depend on belt width and nature of waste water. For the water with high fat content or with sticky substances, the number of nozzles should be higher. Specific technical parameters cannot be given as different variants of screens are delivered.

As an example, following parameters are suggested for SCC screen with width B= 600 mm:

- input pipeline ¾“ including solenoid valve
- together 3 nozzles, size 1/4“
- flow rate of water 0,8 l/s⁻¹ with pressure 0.3 ÷ 0.6 MPa
- spraying is synchronized with belt movement (usually 2x – 3x 5 min. / 1 hour)
- temperature of water on inlet is below 50 °C
- water clarity: without impurities of size greater than 1 mm

Notice to operator:

Individual rods of belt with rakes, sides and pulleys installed are secured against sliding of by Seeger lock rings. The rings are made of chromium steel to be flexible enough for installation and removal. But their resistance to various chemicals is limited. If waste water contains also aggressive chemical substances, even for a short time, strong corrosion and disintegration of these rings can occur. Damage to these rings causes pulley slip, resulting in stopping and seizing of the belt.

For these quite exceptional cases the manufacturer offers Seeger lock rings made of carbon steel that usually show longer service life.

25.11.2009

23.11.2011

03/2012

06/2012

11/2012

02/2013

10/2015

(Removed the electric drives motors warranty)