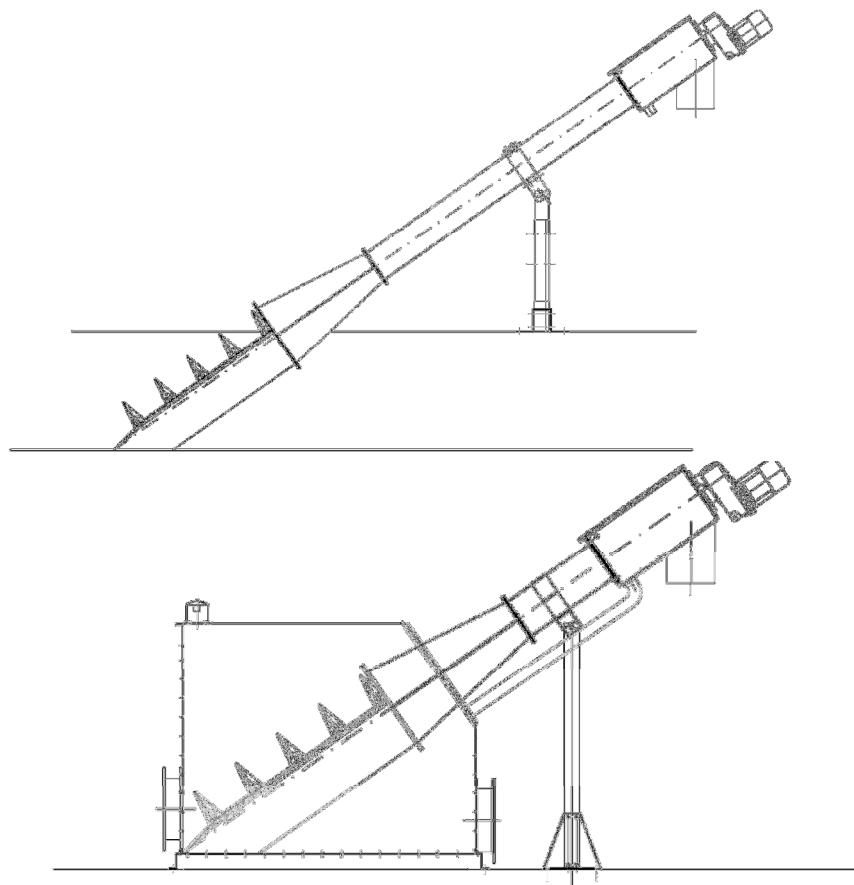


# Operation & Maintenance Manual

MID – IN CHANNEL SCREEN SCREW COMPACTOR. MID-T – SCREEN  
SCREW COMPACTOR IN STAINLESS STEEL TANK



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# 1 General Information

## 1.1 Introduction



Before starting with any operation read carefully the manual to avoid any improper and/or dangerous use of the machine.

Operation and maintenance manual is part of the technical documentation supplied together with the machine and the function is to give the information necessary to use the machine in the correct and safe way.

Manual is addressed to the people in charged for the installation of the machine and to the people in charged for the use and for the maintenance who have to read this manual very carefully.



## 1.2 How to read this manual

Reading this manual you will see different symbols. Right interpretation is as per the following table.

<b>GENERAL DANGER</b>	This type of notice advises the personnel about the dangers during the operation of the machine. In case this notice will not be followed, the machine could cause damages with danger for the personnel.	
<b>DANGER FOR PRESENCE OF ELECTRIC TENSION</b>	This type of notice advises about the presence of electric tension. Before starting with every maintenance on the machine it is necessary to stop the electric tension switching off the general switch. After that it is necessary to be sure that the electric tension is not more present on the machine.	
<b>WARNING</b>	This type of notice advises about the necessity to pay particular attention.	<div style="border: 1px solid black; padding: 5px; display: inline-block;"><b>Warning !</b></div>

### 1.3 Identification

The machine can be identified by the descriptions punched on the metallic plate here following represented and explained. The Plate is easily recognizable on the metallic frame, close to the compaction zone.

 <b>BILFINGER</b>	<div>1</div> <div>Bilfinger Johnson Water Technologies Srl Unipersonale Via Pitagora, 30 - 41010 Limidi di Soliera (MO), ITALY Tel: + 39 059 525720 Fax: + 39 059 525443 www.water.bilfinger.com</div>	
Machine Type:	<div>2</div>	
Serial No:	<div>3</div>	Kw: <div>5</div>
Dry Weight:	<div>4</div>	Date of Manufacture: <div>6</div>

On the plate there are the following details:

- 1) Name and address of the Manufacturer
- 2) Model of the machine
- 3) Serial number
- 4) Dry Weight
- 5) Power (Kw)
- 6) Date of manufacturing

**The data on the Name plate cannot be modified.**

When you are going to contact our after sales service, it is necessary to inform us about the model and serial number of the machine.

## 1.4 Warranty

**Bilfinger Johnson Water Technologies** warrants that the machine was tested in each functional and safety form.

**Warranty period of time is always present with our order confirmation.**

**Warranty is referred to the mechanical components and in case of defect, the manufacturer will replace the components without any extra cost for the customer. Warranty doesn't include the electric motor, electric components and every problem caused from external reasons, wrong maintenance or not permissible use. Every alteration of the machine, in particular on the safety devices, will cause the termination of the warranty and the manufacturer will be free from every responsibility.**

## 1.5 Manufacturer declaration

The machine is manufactured according to the **directive 2006/42/CE** and its following modifications. The machine is destined to be part of a plant that will be executed from the installer.

**Warning !**

In attached to the present manual is reported the Manufacturer Declaration provided for the **directive 2006/42/CE**.

## 1.6 Use & Maintenance Manual - gearmotor

Attached the Use & Maintenance manual of the gearmotor..

## 1.7 Use & Maintenance Manual – Microswitch

Attached the Use & Maintenance manual of the Microswitch (when supplied)

## 1.8 Use & Maintenance Manual – Heating system (when supplied)

Attached the Use & Maintenance manual of the Heating system (when supplied)

## 1.9 Use & Maintenance manual – Solenoid valves (when supplied)

Attached the Use & Maintenance manual of the solenoid valves (when supplied)

## 1.10 Specific drawing

## 1.11 Technical service

To obtain the best performance from the machine and to avoid every possible problem that could cause the termination of the warranty it is necessary to follow all the indications of the present operation and maintenance manual.

This operation and maintenance manual is part of the machine and it must be easily reachable by all the personnel in charge.

In case of need to contact **Bilfinger Johnson Water Technologies**, even after reading the instruction, it is necessary to have this manual close at hand, to have a better understanding of all the explanations.

Please always remember to inform our Service about the serial number of the machine. The serial number is always reported on the Plate of the machine.

## 2 Transport and installation

### 2.1 Checks after reception

After reception of the machine please check if the type and quantity are in conformity with our order confirmation. It is necessary also to verify that the machine is supplied complete in every part in conformity with shipping documents.

Before unloading the machine, it is necessary to check that the machine was not damaged during the transport. In case of damages, it is necessary to document every damage on the shipping document.

### 2.2 Packing

Machine can be delivered on demand in a wood cage, having a weight as specified on the shipping document, dependently from the dimension of the machine (approx 150 Kg).



### 2.3 Lifting and positioning

Lifting and positioning of the machine can be done by means of suitable lifting system for the weight and dimension (for the weight of the machine, please check the weight present on the Name plate and on the weight table chapter 4.5). In case of machine supplied in a wood cage, please take note also about this weight (ref. chapter. 2.2).

The lifting of the machine must be always done using suitable lifting eyebolt fixed on the machine. Always get fixed to the lifting eyebolt by means of hooks with safety fasteners.

In case of machine supplied in a wood cage, it is necessary to lift up the structure connecting the hooks with two appropriate lifting belts, positioned to the wooden beams, assuring an equal distribution of the charge.

Always lift and move the machine using only the eyebolts positioned on the machine.



Picture 1 : Lifting of the machine in a wood cage using belts and chain



Picture 2 : Lifting of the machine using the hooks and the chains appropriates

It is forbidden to use clamps, rings, open hooks or other system that do not guarantee the safety in lifting operation.



**Lifting and positioning operation must be executed only by competent persons. It is forbidden to displace in the action range of the means of lifting.**



**Warning !**

## **WARNING**

**The personnel in charged for the lifting and positioning of the machine must operate with maximum attention to avoid any damage to the goods or to the people. Nobody can stay under the area where the machine is hanging.**

**Check the efficiency of the lifting system to avoid damages to the operator or TO other people.**

**It is forbidden to use lifting chain used as harness. The chain, beside sliding on the transporting tube, can cause damages to the oxide surface on the stainless steel. If, for any reason, a chain is used, all the parts in contact with that must have a new passivation treatment after works.**

**The packing must be removed only when the machine is already positioned close to the installation place** (in the standard the machine has no packing).

## **2.4 Installation area**

The area designated for the positioning of the machine must be provided by the user with all the connections (electric power, air, etc..) for the operation of the machine, in conformity with the information of the present manual, and in conformity with the characteristics of the electric and electronic components. It is responsibility of the user that the positioning area will be conform with the local laws and safety rules: aeration, ground lead, appropriate illumination, etc...

In particular places with frozen risk during winter time, machines without insulation (optional), can be used only inside a proper building. Ice inside extraction screw conveyor can cause damages on the gearmotor or in the solids outlet.

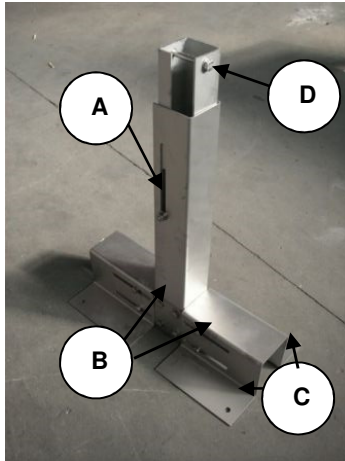


**It is responsibility of the user to preview the positioning area with the safety devices as per the present manual.**

## 2.5 Installation

**During installation it is necessary to consider proper movement space around the machine to make maintenance in safety.**

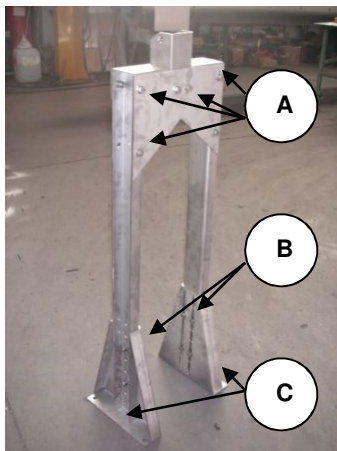
### 2.5.1 How to fix the support mid



Support is supplied pre-assembled in conformity with the agreed dimensions. Prepare the installation area with a concrete plan suitable with the weight of the machine (see the data on the name plate). Check the tightening of the bolts **A**. Thread the band around the pipe on the support, checking the correspondence of the holes **D**. Put the screw and fix it.

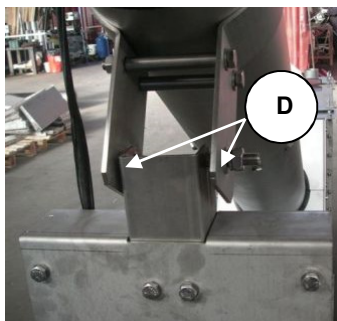
Support must be fixed on the floor with expansion sleeve or equivalent, for each hole preview (ref. holes **C**), in each side. Fixing must be strong and safe, for this reason it is necessary to use expansion sleeve with right dimension. After that it is necessary to adjust the height and to fix the adjusting screw **A** and **B**.

### 2.5.2 How to fix the support mid-t



Support is supplied pre-assembled in conformity with the agreed dimensions. Prepare the installation area with a concrete plan suitable with the weight of the machine (see weight table paragraph 4.5).

Check the fixing of the screws **A**.



Introduce the belt present around the tube on the support, checking the correspondence of the holes **D**. Introduce the screw and to fix it.


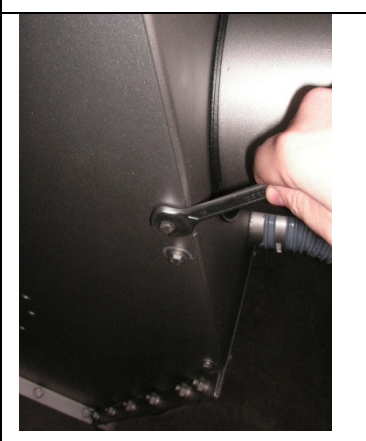
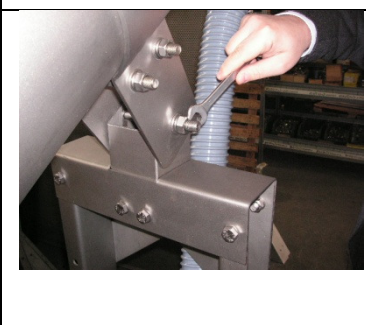
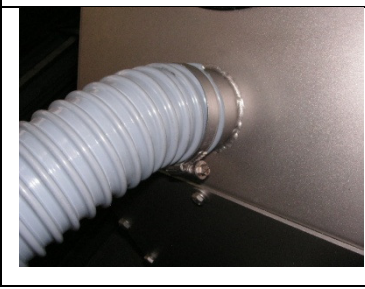
Support must be fixed at the floor by means chemical screws or similar, for each hole preview (ref. position **C**), present on each side. Fixing must be safe and strong, it is necessary to use chemical screw with adequate dimensions. Adjust the height and to fix the regulation screws **B**.



**A not correct fixing could cause damages to the people and to the objects, it is necessary to follow very carefully the instructions of this manual.**

### 2.5.3 Screw Screen Installation in Box

Type MID/T, because of foreseeable space reasons, is supplied with the screw screen separated from the box. The installation of the screw screen must be done on the construction site, following carefully the procedure and the safety conditions of the assigned personnel, as specified here under.

	<p><b>PHASE ①</b></p> <ol style="list-style-type: none"> <li>1.1) Open the box cover and block it with the scheduled bearing.</li> <li>1.2) Dismount the upper part of the box on the side of entrance of the screw screen.</li> </ol>
	<p><b>PHASE ②</b></p> <ol style="list-style-type: none"> <li>2.1) Dismount the upper-lateral part from the side of entrance of the screw screen.</li> </ol> <p><b>PHASE ③</b></p> <ol style="list-style-type: none"> <li>3.1) Using adequate lifting systems (ref. par. 2.3) put the screw screen into the box.</li> </ol>
	<p><b>PHASE ④</b></p> <ol style="list-style-type: none"> <li>4.1) Fix the screw screen on the proper bearing</li> <li>4.2) Close all covers of the box.</li> </ol>
	<p><b>PHASE ⑤</b></p> <ol style="list-style-type: none"> <li>5.1) Connect the liquid discharging pipe to the box.</li> </ol>

#### 2.5.4 Electrical connection

Machine is supplied with standard electric components for the normal operation of the machine:

1. electric motor
2. microswitch (on the cover of the compactor )
3. microswitch (on the cover of the inlet zone – only for MID-T)
4. insulation system with temperature regulator (optional)
5. solenoid valves of the washing system (optional)
6. level sensor (optional)
7. electronic torque limit switch (optional).

It is responsibility of the user to provide the electric panel, installation and connection to the machine following international laws and local rules.



**Electric work must be executed only by specialized worker.**

Machine is provided, on the upper inspection door near the outlet with a safety micro-switch. Connection of this microswitch must be executed that opening the door where the microswitch is fixed, electric power must be excluded, stopping immediately the machine.

Electric motor and safety microswitch connections must be accomplished by the installer and they must be executed following each manufacturer manual attached to the present manual.

To regulate the functioning, the machine must be commanded depending from the level of the channel before the screen. Level indicator (supplied on demand) is connected to the electric panel provided from the installer.

Project and execution of the electric panel is under the responsibility of the installer. We recommend to provide appropriate protection against excessive adsorption of the electric motor.

#### **WARNING:**

**Electric work must be executed only by specialized worker.**

**Check that voltage is the same as per the Name plate present on the electric motor.**

**Electric cables must have the correct dimensions and safety as requested from the electric motor.**



**It is forbidden to work on the electric motor when it is in tension.**

**During electrical connection, the principal electric power line must be disconnected and the work must be executed only from specialized workers following international and local laws and rules.**

**Electric cables must be protected considering the installation area and places to avoid to obstruct the working of the machine, following specific applicable rules.**

**It is forbidden to introduce the hands inside the screw in operation.**

**Any component of the machine can be used as support go up !**



### **2.5.3.1 Technical characteristics of the electric components**

Concerning the technical characteristics of the electric motor and gearmotor, of the microswitch, of the temperature regulator (in case of heat system – optional) and of the solenoid valves please check the manufactures manuals attached to the present manual. What scheduled by the respective fabricants must be respected in relation to the environmental characteristics and electrical connections.

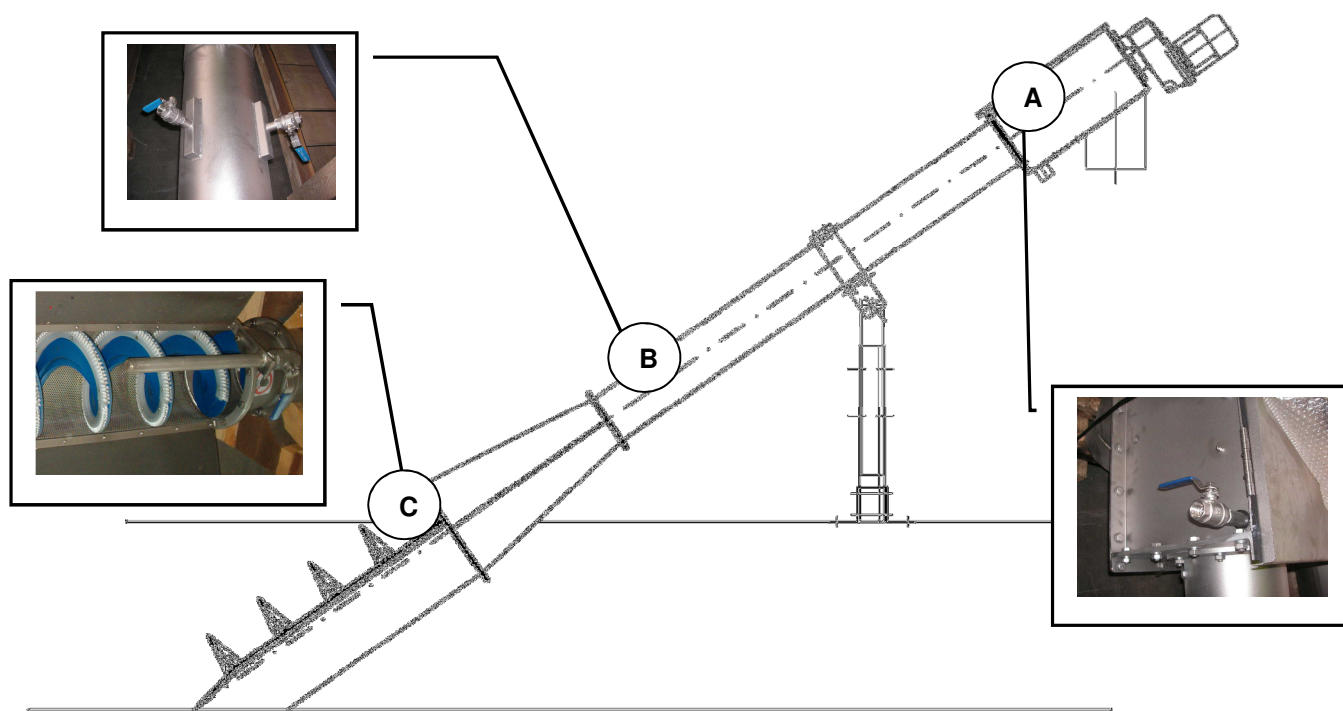
### **2.5.3.2 Working principle**

Electric panel must be designed and supplied by the end-user in conformity with the rules and the laws regulating the safety of the workers.

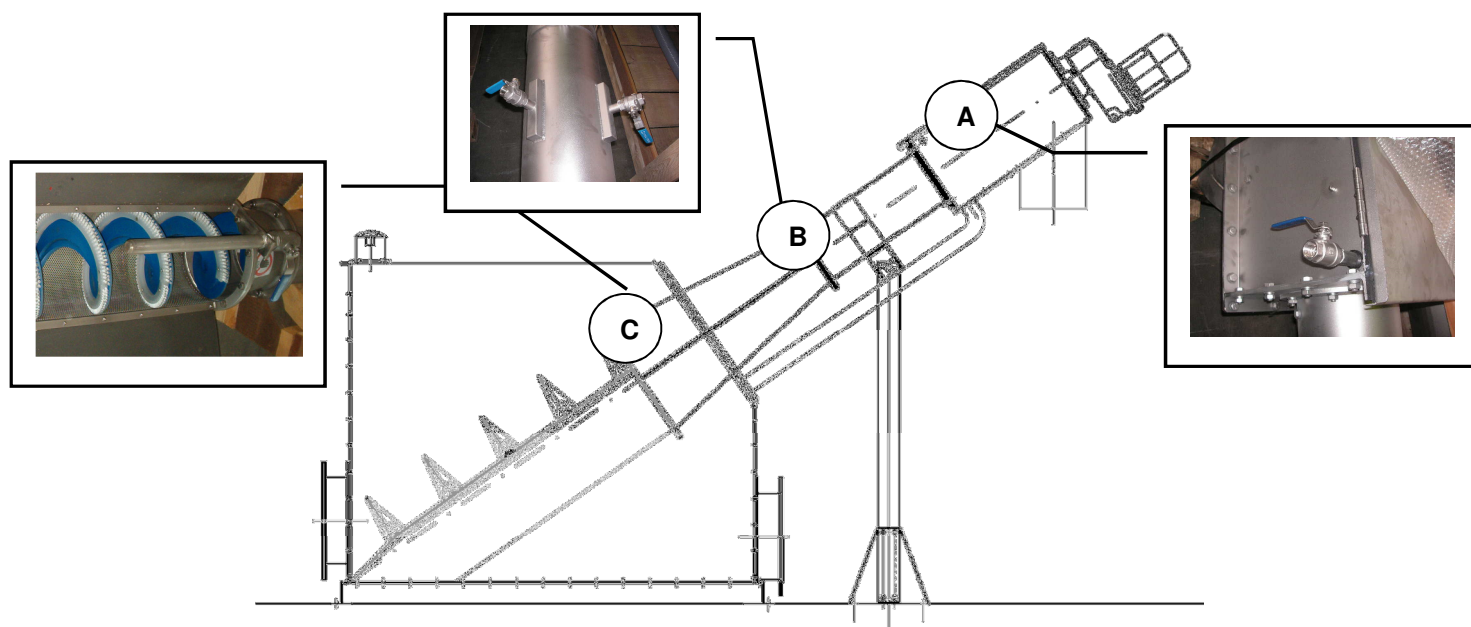
For a correct work it is necessary to follow this working principle:

- 1) Electric motor startup in case of:
  - Manual startup
  - Automatic startup because effluent touch maximum level preview in the channel (level sensor and/or timers)
- 2) Electric motor stop in case of:
  - Manual stop
  - Automatic stop because effluent touch minimum level preview in the channel (level sensor and/or timers)
  - Automatic stop coming from safety microswitch
  - Emergency manual stop (red button)
- 3) Rotation direction inversion in case of:
  - Manual request.

### 2.5.5 Hydraulic connections



Picture 3 : Hydraulic connections model MID



Picture 4 : Hydraulic connections model MID/T

#### Standard version

Standard version includes following water connections to wash the machine during the work:

**A:** ½" manual valve water inlet (0,5 l/sec – max. 5 bar – clean or technical water) to wash the compaction drum



## On request

**B:** ½" inlet (1 l/sec – max. 5 bar – technical or clean water) to wash the screenings in the transport zone to reduce organic matter.

**C:** 1" inlet (1 l/sec – max. 5 bar – technical or clean water) to wash the screen zone.

### 2.5.4.1 Working principle

Some information to use the washing system:

A – Manual valve (or solenoid valve) to use only to clean the compaction drum.

B – Manual valve (or solenoid valve) it is necessary to open it only when the screw is rotating.

C – Manual valve (or solenoid valve) it is necessary to open it only when the screw is rotating.

Typical work of the washing system		
Valve	Type	Working time
A	Manual/Solenoid	10 sec. every 12 hours
B	Manual/Solenoid	when the screw is rotating
C	Manual/Solenoid	when the screw is rotating

### 2.5.6 Bagging unit (optional)



Dewatered screenings are discharged inside plastic bag for hygienic reasons following the present rule and law. Solids are discharged inside plastic bag directly from the vertical outlet. (plastic bag approx 70 mt).

Replace the plastic bag **only with the plant is stopped** – following the instructions:

- close the full bag by means suitable strap to repeat every 50 cm of distance; last fastener become the bottom of the new bag
- cut the two bags with a cutter or with the shear
- pull out a new bag with the desired length.

To replace all the 70 mt continuous bag in the charger, it is necessary to follow these instructions:

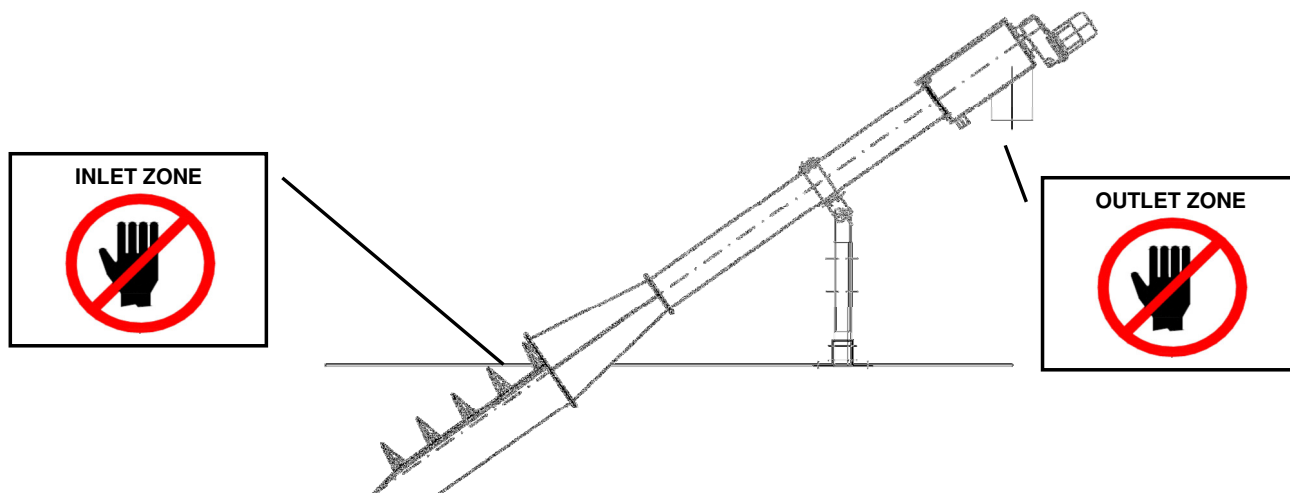
- pull in the lower direction the support cup, beyond the elastic safety ring
- open the fastener ring, taking away the rest of previous film dismantling following local law.
- introduce a new continuous bag fixing the end with the fastener ring to the perimeter
- introduce the support cup.

### 3 Safety rules

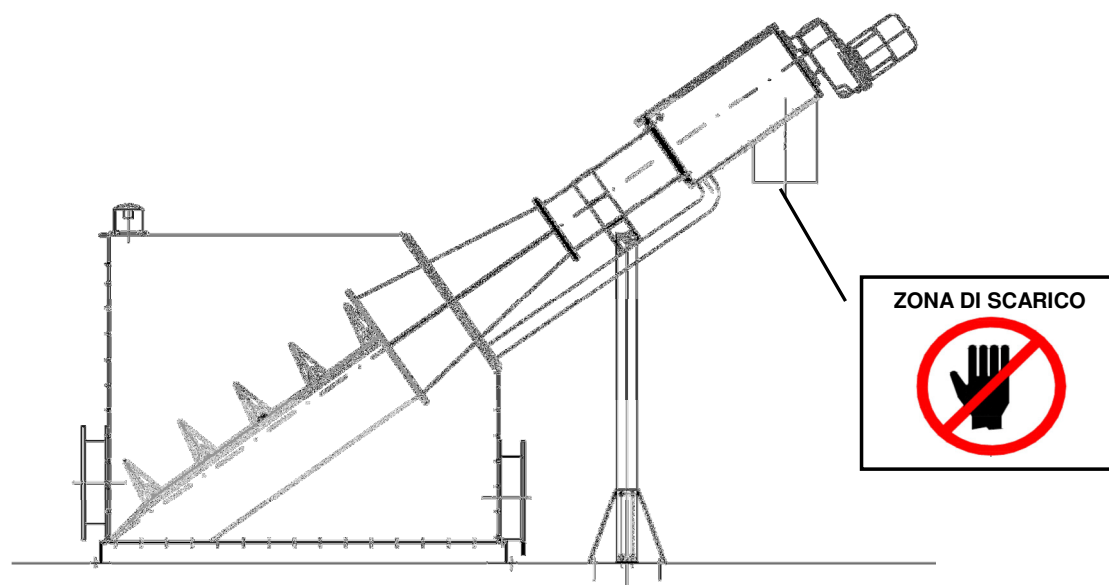
#### 3.1 Not permissible use

Machine is provided with all safety devices, but due the functioning of the machine, there is a part that can be protected only inside the plant where the machine is installed (please check the figure hereunder).

This indispensable protection is all depending of the installer.



Picture 5 : Dangerous positions depending from the installation for the machine MID



Picture 6 : Dangerous positions depending from the installation for the machine MID MID/T

We recommend to protect these areas using devices with immediate switch off, in case of a not safe access (electric power block). We recommend the positioning of proper warning notices near the indicated areas.



## **WARNING:**

**Never put hands, objects etc... inside the solids outlet. A notice must be fixed near the outlet to inform the personnel.**



**Screen zone inside the channel must be closed with a cover. If this operation is not possible, it is necessary to surround the area with a proper enclosure and with notices to prohibit the access. Where it is possible, to provide with automatic device to switch off the machine in case of access.**

### **3.2 Safe use**

**Warning !**

**To avoid every accident, it is necessary to read carefully the following information:**

**The machine can be used only by qualified and expert personnel.**

**All the connections must be executed from qualified and expert personnel.**

**Execute a correct fixing among the different components and a correct fixing to the floor.**

**When the machine is running, all the personnel must remain at the safety distance.**

**Before starting the machine it is necessary that all the safety devices are connected and working and that the machine is in perfect conditions.**

**In case of defects, in particular on the safety devices, the operator must inform immediately his superiors, the safety manager and the operator of the next shift.**

**If the defect prevents the machine from a safe use, the machine must be immediately stopped.**

**If during the working more people are in charged, before to make any operation it is necessary to inform also the other people.**

**The machine can be used only for the correct use (see . 4.1)**

**Every modification regarding the use or the safety conditions can be executed only from personnel Bilfinger Johnson Water Technologies srl , and following this, Bilfinger Johnson Water Technologies srl refuse every responsibility for not authorized modifications or damages caused from these modifications.**

**It is forbidden to remove safety devices present in the machine.**

**All checks, maintenance etc..., can be executed only by qualified and expert personnel.**

**Personnel in charged must use a proper workwear. It is necessary to ask for this workwear (gloves, shoes, ...) at the safety manager.**

**Disconnect electric power before making every operation and/or maintenance at the machine.**

**To avoid every accidental startup of the machine during inspection, cleaning and maintenance, it is necessary to turn the general switch on the position OFF and push the emergency button to block the machine.**

**Before starting the machine it is necessary to be sure that all the safety devices are active.**

**Bilfinger Johnson Water Technologies srl refuses every responsibility for damages to people and objects caused from the absence and/or tampering of the safety devices (notices and protections).**

**It is necessary to make inspection of the plant minimum once per day, or once each working shift to check possible damages or defects that can be seen from outside.**

**In case of any anomaly, stop immediately the plant, in particular if there are risks for your safety or for the safety of the plant.**

**Be sure that safety devices, safety notices and the identifying plate of the plant are always clearly readable.**

**It is compulsory the connection to the floor of the external metallic part of the machine.**

**It is forbidden to remove safety and warning notices.**

**It is forbidden to start the work with safety devices opened or to open them during the working.**

**Touching the rotating part of the machine could cause serious injuries.**

**Never introduce hands inside the outlet of the compaction zone.**

### **3.3 Safety devices of the plant**

Every plant must be provided, by the installer, with an emergency button (red colour) to stop the plant. Pushing this button in particular dangerous conditions the plant must stop immediately.

Emergency button must be present near the machine and it must be easily approachable.

Safety devices include:

- **Microswitch on the cover in the compaction zone**
- **Microswitch on the cover of the screen zone (only for MID-T)**
- **Protection covers of electric motor fan**
- **Protection cover of the drive shaft**
- **Enclosure, covers or automatic protection of the screen zone**
- **Warning notices**





It is however responsibility of the installer to ensure the presence of all protections necessary to grant a safe use of the plant in both phases of usage and maintenance.

### 3.4 Residual risks

Bilfinger Johnson Water Technologies srl has produced and built the machine in object, trying to reduce the risks as much as possible.

Anyway remain some risks related to any deficiencies of maintenance or at the manumission of the machine otherwise they cannot be deleted during planning and realization of the machine. Other sources of risk are represented from behaviors that are not corresponding at what this manual is explaining and also at the missing respect of Laws and Standards related to accident prevention and safety on working.

This following table resumes the remainder risks and the behaviors to reduce them.

Picture	Description	Measures
	The machine has moving parts that can cause injury	It is several forbidden doing maintenance with machine in motion. Prevent access to the channel discharge with the while the machine is working (railings, fences, interlocking openings).
	The machine must be equipped with its own electrical system : removing the covers of the motor terminal you can access to tension parts	Put on safety the machine before every operation. Only specialized personnel can access to the parts electrically connected. The electric part of the machine built by the installer must be according to EN 60204-1.
	Hot surfaces : some mechanical object placed inside the machine can reach temperature higher than 60° degree only in case of malfunction	Wait that the gear reach room temperature.
	Risk on falling into the channel Risk of drowning	The channel must be supplied with correct protection or railings, both upstream and downstream the machine

## 4 Description and specifications

### 4.1 Safe and correct use

Screen screw compactor is a machine designed to screen every kind of effluent and to convey the screenings out from the liquid, dewatering it.

Depending from the installation, machine can be supplied:

- Without tank: INSTALLATION IN THE CHANNEL (type MID)
- With tank: DIRECTLY CONNECTED TO THE EFFLUENT PIPE (type MID/T).

MID and MID/T are used to treat waste-water in the municipal and industrial plants and to separate solids from liquid.

In particular MID, installed in the channel at the inlet of the waste water treatment plant, provides to separate solids from the liquid, to lift up the solids by means a screw conveyor, to dewater the solids and to discharge it in the container supplied by the end-user, or in another conveyor. Start of the rotation can happen only in case of high effluent level before the screen, caused because the clogging of the filtration meshes. In case of rotation of the screw is continuing more than 5 minutes, it is necessary to check this inconvenient (example, effluent flow-rate higher than the maximum capacity of the screen, or washing water not present in the circuit ....).

Screen screw compactor is composed principally from a screen basket connected, by means a conic section, with a transport tube where a shaftless screw conveyor rotates. During the rotation, the screw conveyor clean the screen basket with particular brushes fixed to the screw, and it convey the solids until the compaction and discharge zone.

Screw conveyor rotates on stainless steel plates, bolted inside the tube.

Shaftless screw conveyor is designed without any intermediate or end bearing, to avoid every possible blockage of screenings during the convey and/or the discharge...

MID/T makes the same job of MID, but it is supplied with stainless steel tank.

**Every other use of the machine will cause the end of the warranty and will avoid to Bilfinger Johnson Water Technologies srl every responsibility.**

### 4.2 Description and functioning



Waste-water enter in contact with the lower screen clogging it and causing the increase of the level before the screen.

This increase of the level is checked by a level sensor (not included in the supply), that give the signal to start the screw conveyor for a definite time.

Rotation of the screw cause the cleaning of the lower screen (by means the cleaning brushes), and it cause the transport of the solids until the compaction and discharge zone.

Intermittent rotation of the screw, will cause a permanence of the solids in the screen zone

in the transport zone and in the compaction zone for a certain time, suitable to dewater the solids.

The hydraulic profile of the channel where the screen MID MID/T is installed, must be considerate not to create downstream water levels different from the standard level provoked by the flow rate to be treated.

### 4.3 Commands

Handling of the plant is assured automatically measuring the level before the screen (compared or not with the level after the screen) or with a timer or with the start/stop of a pump before the screen to send waste water in the plant.

<b>Warning !</b>
------------------

### 4.4 Working principle, not permissible working

Functioning of the plant or functioning of each machine can be prejudiced if solids:

- Cannot be mechanically separated from the liquid,
- Solids form an agglomerate.
- Solids cause incrustations
- Solids cause chemical reaction

**In case of screenings that form an agglomerate or cause incrustations, It is necessary that these solids could be removed from the machine using simply water in pressure!**

Solids % present in the effluent has not to exceed the % used from our Company to give the correct flow rate of the machine.

If in the effluent to screen there is a big presence of long fibers it is possible that MID - MID/T could have some functioning problems. It is better to avoid MID - MID/T screen in these conditions.

### 4.5 Technical specifications

Here following are the technical characteristics and dimensions of the principal types MID and MID/T manufactured from Bilfinger Johnson Water Technologies srl

#### 4.5.1 Type MID – Building features Standard

TYPES: MID2, MID3, MID4, MID5, MID6, MID7

FILTRATION MESHES: 0,25 – 0,5 – 1 – 2 – 3 – 5 – 7 – 10 mm (*further meshes on request*)

SCREW TYPE: shaftless

SPIRAL TYPE: conical

INCLINATION: 35° - 45° (*further inclinations on request*)

SCREEN CLEANING SYSTEM: with brushes bolted

TOTAL LENGHT OF THE TRANSPORT ZONE: variable

GEARBOX TYPE: parallel shaft

POWER INSTALLED: 0,55 kW – 1,1 kW

SCREW ROTATION SPEED: 10 rpm

HEAT SYSTEM (optional): mod. ST35073-16 W/m (see Specifications attached)

#### 4.5.2 Type MID – Flow rates (m<sup>3</sup>/h)

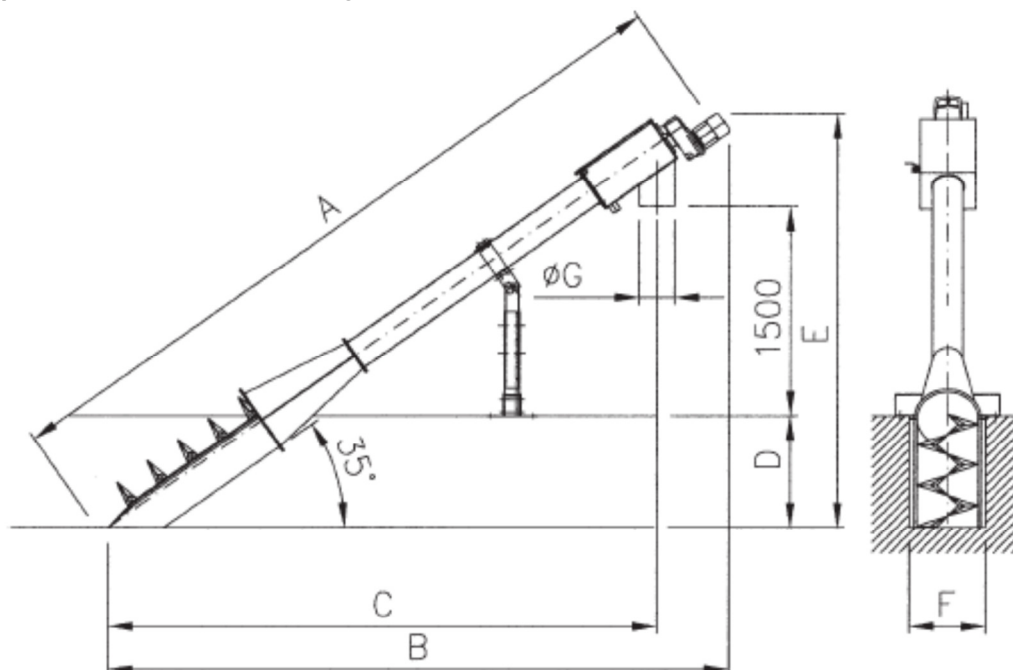
Table with coefficient. You have to multiply the flow rate with the coefficient, depending from the typology of effluent to screen.

Effluent	Coefficient
Municipal from 200 up to 500 mg/l solids	1
Municipal, rain time	1,3
Food packaging: slaughterhouses	0,7
Slaughterhouses with presence of grease	0,5
Tanneries	0,6

Meshes	MID 2	MID 3	MID 4	MID 5	MID 6	MID 7
mm	mc/h	mc/h	mc/h	mc/h	mc/h	mc/h
7	180	200	368	480	670	1070
5	140	160	270	396	594	970
3	100	126	180	324	468	750
2	85	100	150	315	420	670
1	50	90	130	270	360	530
0,5	45	60	90	195	280	370
0,25	20	35	55	130	200	290
Level before the screen	400 mm	435 mm	460 mm	570 mm	680 mm	800 mm

Flow rate on the tables the maximum flow rate for the screen inclined 35° and the level before the screen is the maximum possible level.

#### 4.5.3 Type MID – Dimensions and Weights



	SCREW SCREENS WITH INTEGRATED COMPACTOR					
	MID 2	MID 3	MID 4	MID 5	MID 6	MID 7
A	5355	5355	5355	5355	5760	6100
B	4500	4500	4500	4500	4890	5160
C	3963	3965	3965	3965	4220	4480
D	800	800	800	800	800	1000
E	2990	3000	3000	3000	3230	3430
F	350	350	450	550	650	850
G	265	273	273	273	406	406
Kg	400	430	470	520	610	660
Kw	0,55	0,55	0,55	0,55	1,1	1,1

Dimensions on the table are standard dimensions for each size of screen. Different dimensions must be agreed before the order.

#### 4.5.4 Type mid/t – building features standard

TYPE: MID2/T, MID3/T, MID4/T, MID5/T, MID6/T, MID7/T

SCREEN MESHES: 0,25 – 0,5 – 1 – 2 – 3 – 5 – 7 – 10 mm (*further meshes on request*)

SCREW TYPE: shaftless

SPIRAL TYPE: conical

INCLINATION: 35° - 45° (*further inclination on request*)

SCREEN CLEANING SYSTEM: with brushes bolted

TRANSPORT ZONE LENGTH: variable

GEARBOX TYPE: parallel shaft

POWER INSTALLED: 0,55 kW – 1,1 kW

SCREW ROTATION SPEED: 10 rpm

HEAT SYSTEM (optional): mod. ST35073-16 W/m (See Specifications attached)

EMISSION OF AIR NOISE:       Weighted sound pressure level  
(Lpa) does not exceed the 70 dB

#### 4.5.5 Type MID/T – Flow rates (m<sup>3</sup>/h)

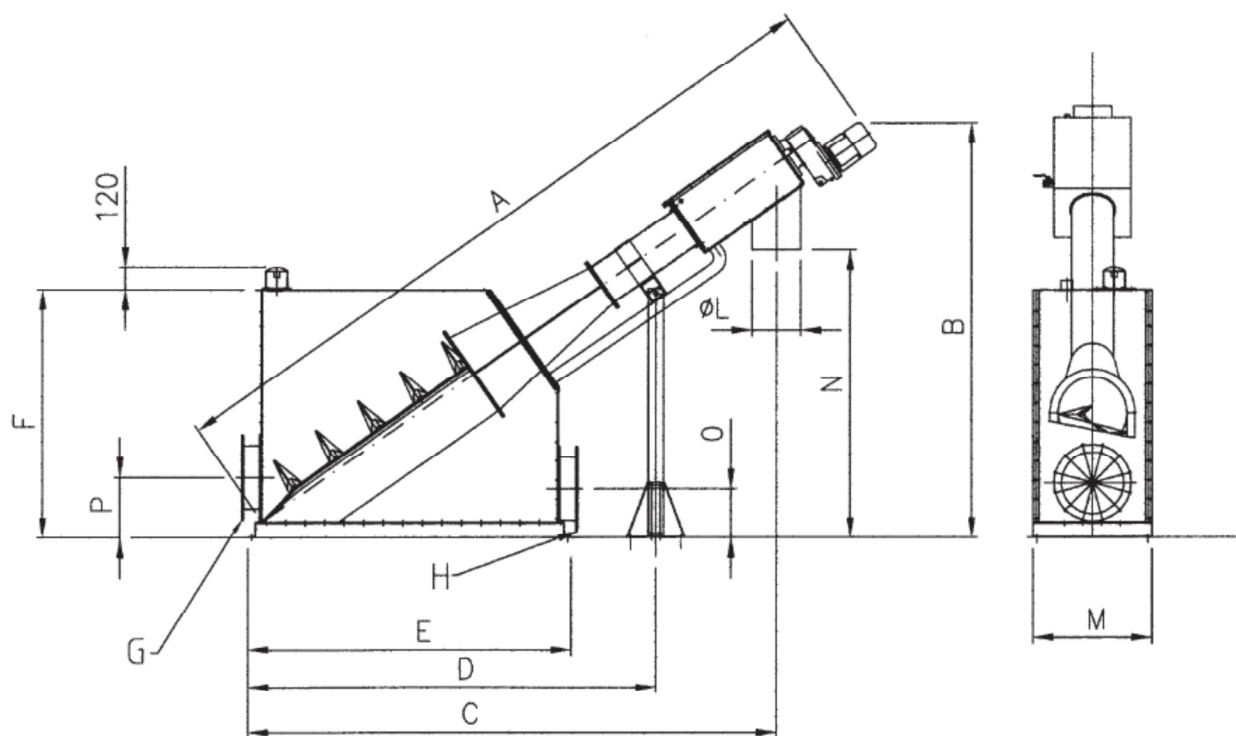
Table with coefficient. You have to multiply the flow rate with the coefficient, depending from the typology of effluent to screen.

Effluent	Coefficient
Municipal from 200 up to 500 mg/l solids	1
Municipal, rain time	1,3
Food packaging: slaughterhouses	0,7
Slaughterhouses with presence of grease	0,5
Tanneries	0,6

Meshes	MID 2/T	MID 3/T	MID 4/T	MID 5/T	MID 6/T	MID 7/T
mm	mc/h	mc/h	mc/h	mc/h	mc/h	mc/h
7	180	200	368	480	670	1070
5	140	160	270	396	594	970
3	100	126	180	324	468	750
2	85	100	150	315	420	670
1	50	90	130	270	360	530
0,5	45	60	90	195	280	370
0,25	20	35	55	130	200	290
Level before the screen	400 mm	435 mm	460 mm	570 mm	680 mm	800 mm



#### 4.5.6 Type MID/T - Dimensions and weights



SCREW SCREENS WITH INTEGRATED COMPACTOR IN TANK						
	MID 2/T	MID 3/T	MID 4/T	MID 5/T	MID 6/T	MID 7/T
A	3785	3790	3790	3790	4200	5070
B	2170	2200	2200	2200	2450	2950
C	2750	2750	2750	2750	2980	3700
D	1990	1990	2185	2110	2320	3050
E	1260	1300	1605	1675	1755	2080
F	1000	990	1200	1290	1320	1630
G	DN150PN10	DN200PN10	DN250PN10	DN300PN10	DN400PN10	DN500PN10
H	DN150PN10	DN200PN10	DN250PN10	DN300PN10	DN400PN10	DN500PN10
L	273	273	273	273	406	406
M	406	406	516	616	716	916
N	1480	1500	1500	1500	1560	2070
O	175	205	235	255	310	370
P	250	255	285	315	380	440
Kg	550	580	630	700	800	950
Kw	0,55	0,55	0,55	0,55	1,1	1,1

Dimensions on the table are standard dimensions for each size of screen. Different dimensions must be agreed before the order.

## 5 Use of the machine

### WARNINGS:

**Before proceeding with start/stop of the machine, please check that all the blocking conditions are removed.**

**Before proceeding with the start/stop of the machine, please check that all safety devices are present and perfectly efficient.**

### Checks and startup

Before starting the machine, please provide as per the following:

Verify the positioning and fixing of the machine, verify the fastening of all the bolts used to install the machine.

Check all hydraulic connections.

Check electric devices and the electric motor box. It must be totally sealed.

Check that all the covers are closed.

Check the rotation of the screw. It must be as per the sticker indicator (see picture here under).

Check that all the safety devices at the inlet and at the outlet are present.

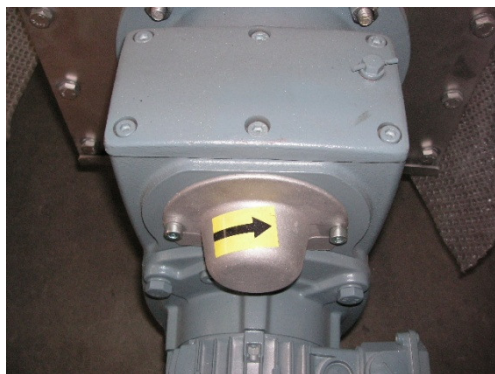
Check that all the warning notices are presents on the machine.

### Warning:

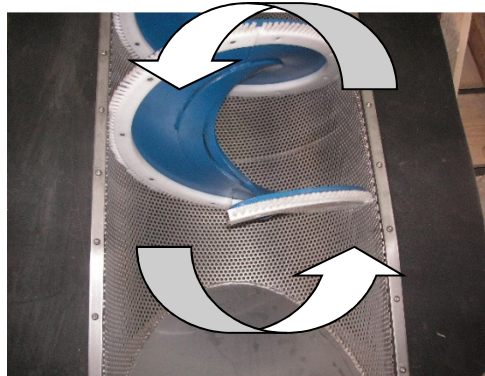
**During first startup, it is necessary to check very carefully regarding every single thing that could appear like a working defect, for example: vibrations, high noise level, wrong rotation direction, etc....**

**Startup procedure must be executed every time that the machine remained stopped for a long period of time (more than one week).**

**To grant personnel safety and machine safety, it is necessary to read very carefully the section SAFETY RULES.**



Picture 7 : Rotation sense of the motor



Picture 8 : Rotation sense of the screw

## 6 Maintenance

### 6.1 Preliminary operation for safety cautions:

**Before making any maintenance, please switch off the electric power.**

#### Safety conditions in case of maintenance

In case of particular dangerous conditions, a second person must be present together with the technician in charge for maintenance.

Maintenance of the unit must be executed only from expert, trained and qualified personnel.

Before proceeding with the maintenance, it is necessary to inform all the other personnel in charge in the work.

Do not operate any maintenance when the machine is running.

Every time, before restarting the machine, be sure that all the protections and safety guards are efficient; be sure that all the tools are removed; be sure that other personnel is not working on the machine.

#### WARNING:

**To grant the full efficiency of the machine only original spare parts can be used.**

### 6.2 Periodical checks

It is possible to divide all the checks in two parts:

#### Checks to do after first 10 working hours

Description
Check bolts and screws fixing wearing bars
Electric motor and gearbox: Check noise level
Check the efficiency of washing systems

#### Periodical checks

Description	Periodicity
Cleaning brushes	100 hours
Screen basket efficiency	100 hours
Washing system efficiency	Weekly
Bolts fixing	100 hours
Absence of clogging in the compaction zone	Weekly
Absence of blockage in the screenings outlet	Weekly
Absence of blockage liquid return pipe (from compaction zone)	Weekly
Gearbox	Monthly
Electric motor	Monthly

For gearbox lubrication please refer to the gearbox manufacturer use and maintenance manual here-attached.

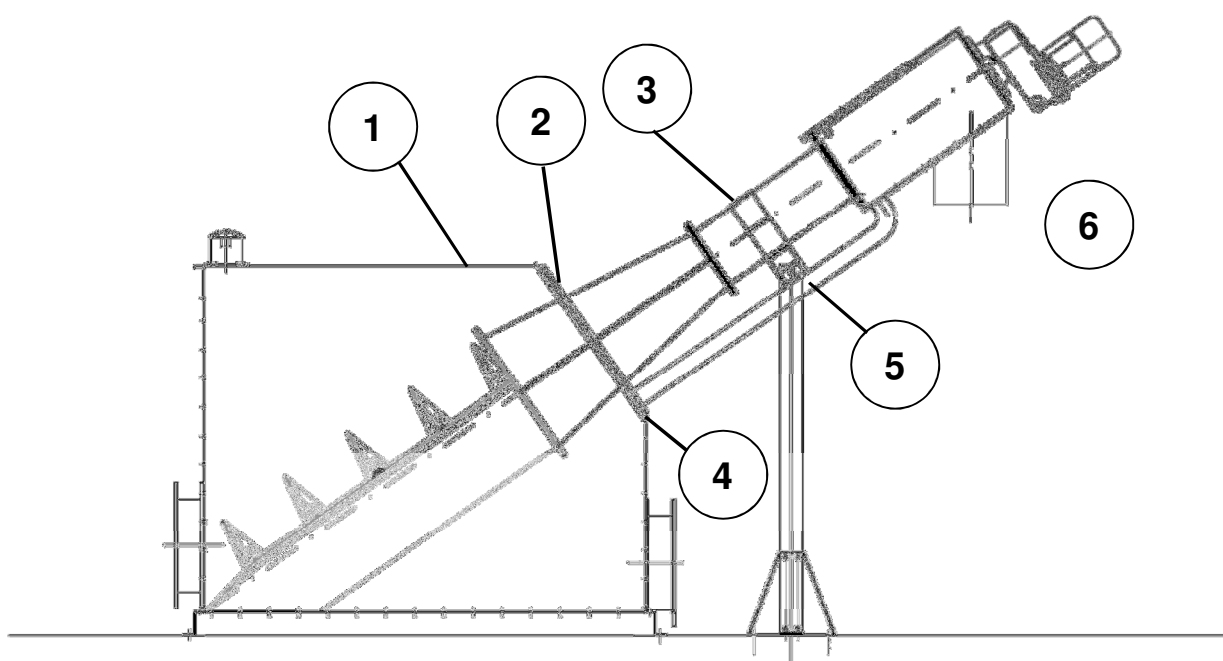
### 6.3 Extraordinary maintenance

Here-under you can find information how to replace some components.

**To make all the replacements it is necessary to remove the machine from the working area, wash it and put it in safe conditions (see chapter 6.1).**


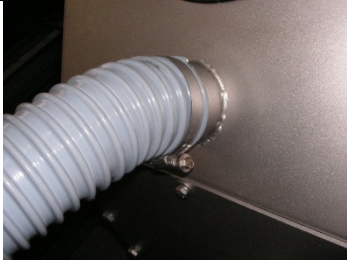
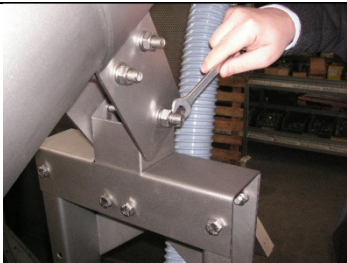
#### 6.3.1 Preliminary operation to dismount screen screw compactor from the tank mid/t

Maintenance as per hereunder, in case of MID/T, must be executed after the extraction of the screen from the tank:




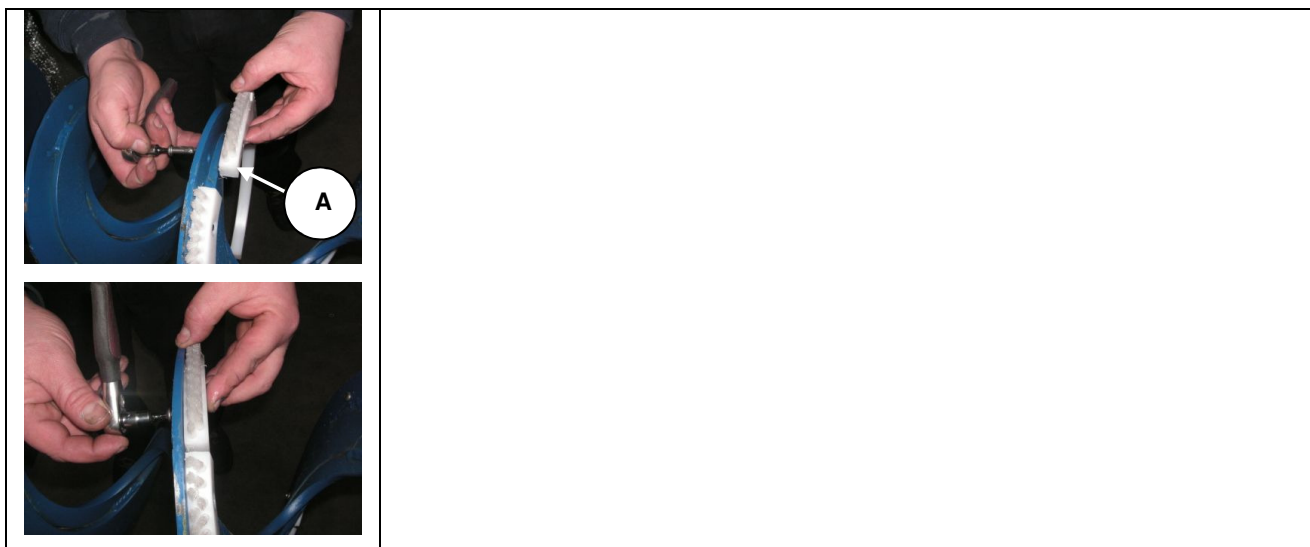
#### PHASE ①

- 1.3) Open the cover of the tank, blocking it with the support
- 1.4) Dismount the cover of the tank from the side the effluent inlet

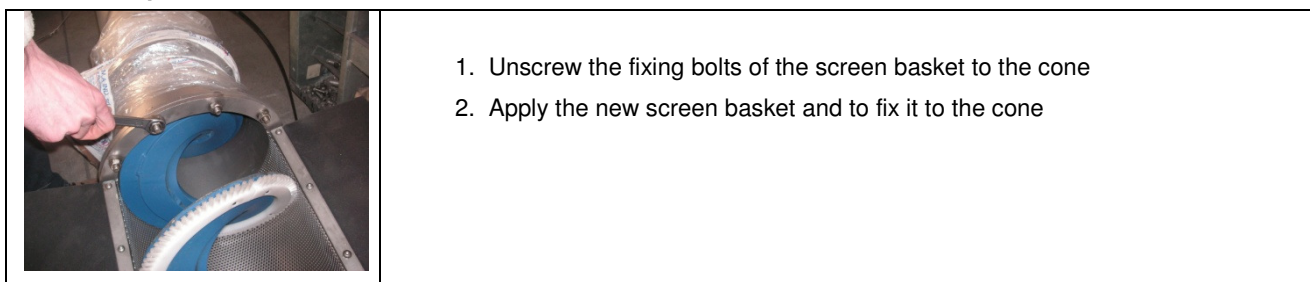
	<p><b>PHASE ②</b></p> <p>2.1) Dismount the lateral part from the side where the screen screw compactor is introduced</p> <p><b>PHASE ③</b></p> <p>3.1) Be sure to put the screen screw support in a safe position by means suitable chain to fix inside the hocks</p>
	<p><b>PHASE ④</b></p> <p>4.1) Move the flexible liquid pipe from the tank</p>
	<p><b>PHASE ⑤</b></p> <p>5.1) Dismount the screen screw from the support</p>
	<p><b>PHASE ⑥</b></p> <p>6.1) With adequate lifting devices (ref. chapter. 2.3) extract the screen screw</p>

### 6.3.2 Replacement of the cleaning brushes

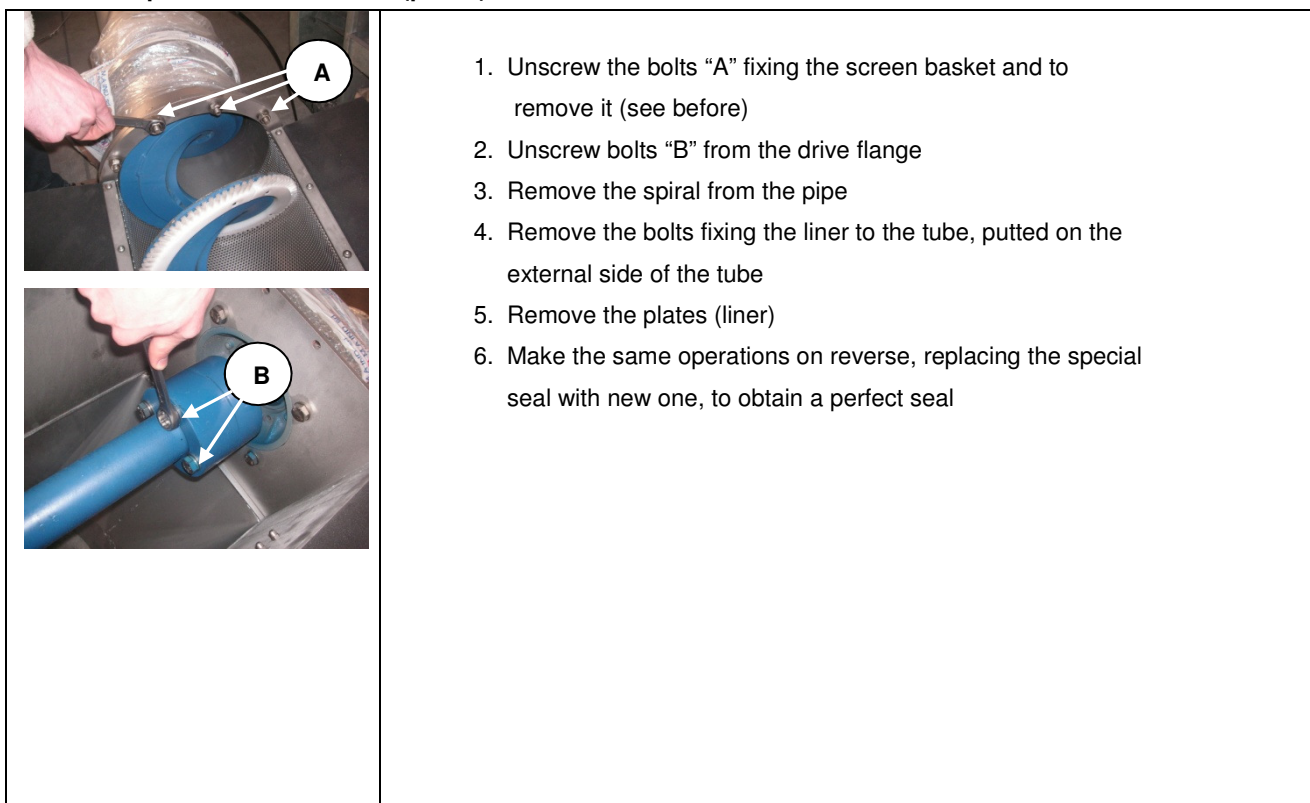
	<ol style="list-style-type: none"> <li>1. Dismount the screen unscrewing fixing bolts</li> <li>2. Unscrew the bolts <b>A</b> fixing the brushes to the spiral.</li> <li>3. Fix new brushes to the spiral with new bolts</li> <li>4. Reassembly the screen</li> </ol>
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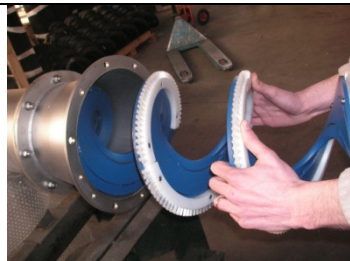
### 6.3.3 Replacement of the screen basket



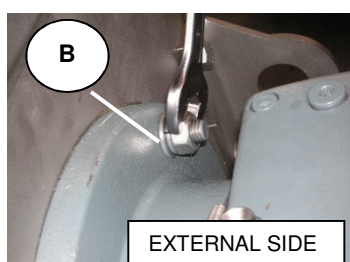
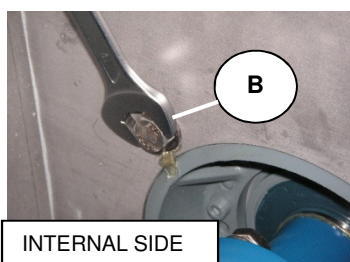
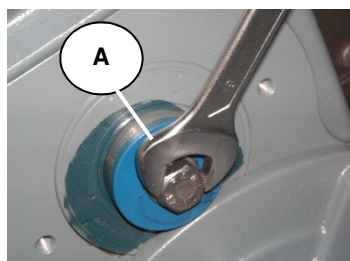
### 6.3.4 Replacement of the liner (plates) in the tube and/or cone







#### 6.3.5 Replacement of the gearmotor








1. Dismount the protection
2. Unscrew bolt **A** fixing the motor shaft
3. Unscrew bolts **B** fixing the gearmotor to the screen screw frame.
4. Put the new gearmotor following the previous operation on the opposite.



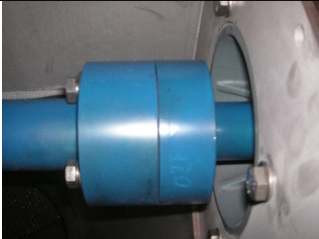


## 7 Accessories and spare parts

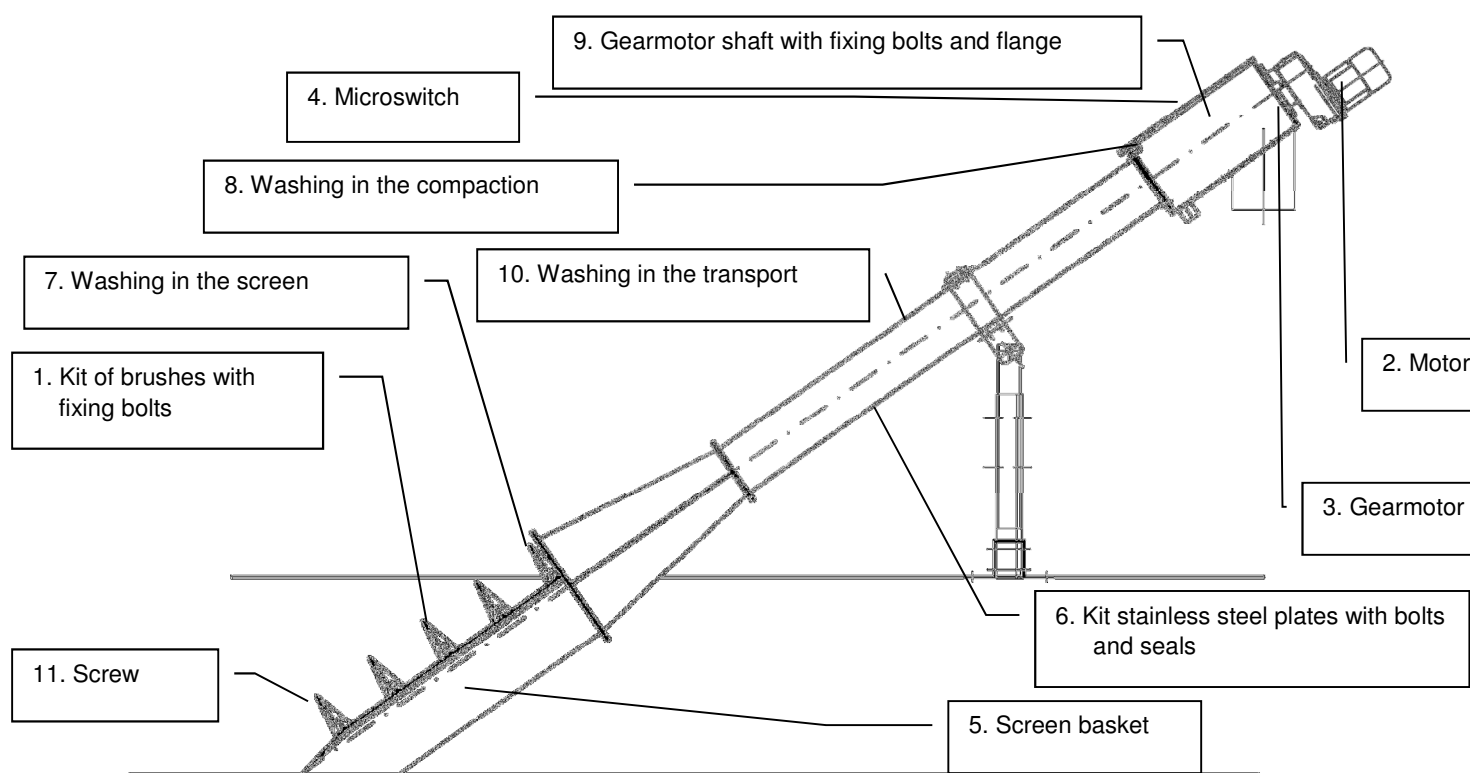
### 7.1 Spare parts

Please find hereunder a list with the principal parts. Bilfinger Johnson Water Technologies srl is in the condition to replace every single component of the machine.

Pos.	Description	Picture
1	Kit of brushes with fixing bolts	
2	Motor	
3	Gearmotor	
4	Microswitch	
5	Screen basket	
6	Kit stainless steel plates with bolts and seals	



Pos.	Description	Picture
7	Washing in the screen (optional)	
8	Washing in the compaction	
9	Gearmotor shaft with fixing bolts and flange	
10	Washing in the transport (optional)	
11	Screw	



Picture 9 : Spare parts MID - MID/T

## 7.2 How to order spare parts

To order spare parts it is necessary to check the label present on the unit:

- Machine model and serial number
- Manufacturing year
- Part code (if specified on the part).

## **8 Other information**

### **8.1 Long term storage**

In case of long term storage:

Clean the machine in the screen zone, transport and compaction.

Fix the machine in a wood cage and to stock it inside a covered area.

Gear motor: Follow the instruction present in the manufacturer manual.

Before restarting the machine to proceed as per first startup.

### **8.2 Dismantling of the machine**

In case of dismantling of the machine, it is necessary to separate different materials composing the machine:

Plastic, brushes and seal, must be separated and stocked in a proper area

Metallic part must be recycled as steel material.

Gear motor oil must be stocked in a proper area.

#### **PRECAUTIONS:**

**Dismantling of the machine must be executed following general and local environmental rules.**

## 9 Fault research

Problem						
Machine doesn't start and electric motor doesn't work						
Vibrations with machine empty						
High adsorbed power with machine empty						
Vibrations at the inlet during the work						
Machine is running, but after a few second, electric motor limit switch stop the machine						
Effluent level before the screen remain always at the maximum level and the drum rotate continuously						
Screw doesn't lift up the solids						
			Cause		Solutions	
●					There is not electric power.	Switch on electric power.
●	●	●	●		Wrong electric connections.	Make the electric connections.
●			●		Bad regulation of electric motor limit switch.	Regulate it.
●					Very low tension, very high frequency.	Check wire conditions.
●	●				Overload for screw conveyor blocked.	Check the reason of the block and to start the screw again.
	●		●	●	A foreign solid can block the screw.	Remove the foreign solid.
	●				Screw conveyor components can be in a wrong alignment, compromising the correct axe of the machine.	Check the fixing of bolts connecting the flanges.
	●		●		Bad fixing of the liner (bolts)	Fix the bolts from outside in the tube and in the cone.
		●			Gear motor can be damaged.	Check that electric motor is well connected. Voltage and phases must be as per electric motor manufacturer label.
			●		Screw conveyor rotation direction can be in the wrong sense.	Invert electric motor poles.
				●	A foreign solid can block the screw.	Remove the foreign solid, inverting the screw rotation direction.
				●	Brushes not efficient.	Replace it.
				●	Screen clogged.	Clean it.
				●	Very high % of solids in the effluent.	Check the situation at the inlet of the plant.
				●	Very high flow rate.	Reduce the flow rate.
				●	High level after the screen.	Check the reason because the level of the effluent after the screen remain high.

						●	Filtration meshes of the drum are not correct to treat the effluent typology.	Replace the drum if necessary.
						●	A foreign solid can block the screw.	Remove the foreign solid, inverting the screw rotation direction.

## **10 Attachments**

- 10.1 Conformity declaration**
- 10.2 Operation and maintenance manual – gearmotor**
- 10.3 Operation and maintenance manual – microswitch**
- 10.4 Operation and maintenance manual – heat system (when supplied)**
- 10.5 Operation and maintenance manual – solenoid valves (when supplied)**
- 10.6 Specific drawing**

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