

General Information


Hydro-Sludge™ Screen General Information

Overview

The Hydro-Sludge™ Screen is a horizontal in-line coarse material separator, comprising of four principle zones; inlet, screening, pressing (compacting) and discharge. The feed from the inlet, enters the center of the screening zone, where the coarse material retained on the inner surface of the perforated screen, is transported to the pressing zone and onwards to the discharge by an Archimedean screw. Compacted coarse material (screenings) is discharged into a suitable container, by the action of a regulated retention cone, controlled by a pneumatic system linked the varying drive load (torque) of the drive motor.

Safety Precautions

The purpose of this Operation & Maintenance Manual is to ensure all personnel working with the plant are aware of the safe and correct way to carry out any work. The instructions and information given are as explicit as is reasonably practicable, however, competency and expertise are necessary in the operation and maintenance of the machine, and to ensure reliable operation it is strongly recommended that such work is undertaken by only experienced and authorized personnel.

Throughout this manual  will be used to highlight important warning notes.

Before carrying out any inspection, maintenance, repairs, overhauls or commissioning on the Hydro-Sludge™ Screen; this manual must be read in detail, and always ensure that the machine has been isolated from both its control panel and the raw material feed, where necessary to ensure that accidental starting of the machine cannot occur.

In addition to the above, full adherence with current health and safety rules, acts, laws and legislation must be observed, along with specific site procedures.



The Hydro-Sludge™ Screen must not be operated without operational protection devices and covers in place.



The Hydro-Sludge™ Screen must not be used if any alterations have been carried out to the machine which affect its normal operational behaviour, and more importantly any alterations which affect the safe operation of the machine.

If any of the above are observed, isolate the machine and inform the person or department responsible for the machine.

On completion of any maintenance, all guards/covers must be properly refitted before power and feed are reinstated and the machine restarted.

This manual should be read in conjunction with the Electrical and Pneumatic Control Panel Operation & Maintenance Manual, associated with the Hydro-Sludge™ Screen.

The Hydro-Sludge™ Screen warranty will be invalidated, and Hydro cannot be held responsible for product failure, if:

- The machine is used for work for which it was not designed or intended.

- The Hydro-Sludge™ Screen is used to process sludge outside the criterion detailed in the Technical Data, see section 9.0, p17).
- Damage is caused to the machine as a result of; operation and maintenance not being carried out to the details of this manual, or operation without the required safety devices.
- Any modifications or changes are carried out to the machine that affects its normal operation.

Known Hazards and Risks

The machine, when operated by fully trained personnel, is an exceptionally safe piece of equipment, which if operated correctly and maintained as identified in this manual, should provide many years of service.

However, the following are areas that **must** be given due consideration at all times during the operation, inspection and maintenance of the machine:

- Moving Parts - These can become accessible when covers or guards are removed for inspection of the operation of the machine.
 - Danger of cutting, shearing and crushing. Danger of contamination from the materials that have been processed.
- Pneumatic System - Compressed air must **never** be directed at uncovered skin, eyes, ears or any part of the body.
 - Danger of grit/dirt being forced into the body under pressure of the compressed air.
- Junction Boxes - Low voltage live terminals, will be accessible if the electrical supply is not isolated before opening the covers.
 - Danger of electrocution.
- Gearbox - Damage could be sustained to the gearbox housing if the breather or vent is not fitted, or is blocked.
 - Danger of gearbox body bursting/cracking. Danger of contamination from oil spillage.
- Central Joint - If the machine requires splitting in half for maintenance or inspection, then a small amount of effluent could escape upon separation of the two halves.
 - Danger of contamination from materials being processed.

Avoid the above by:

- Ensuring that only fully trained personnel operate, inspect and maintain the machine.
- Ensure power and feeds are isolated.
- Always wear appropriate personal protective equipment.
- Wash your hands and any other parts of the body that come into contact with sludge as soon as convenient.
- Always observe all safety rules, acts and regulations when dealing with the machine.



The electrical devices fitted to the standard Hydro-Sludge™ Screen are not intrinsically safe, i.e. they are not explosion proof, and therefore must not be installed in hazardous locations.

General Notes

Description of Operation

The machine is designed to process solid matter from fluids of higher viscosities i.e. sludge and comprises of four main zones, as shown in Figure 3.a.

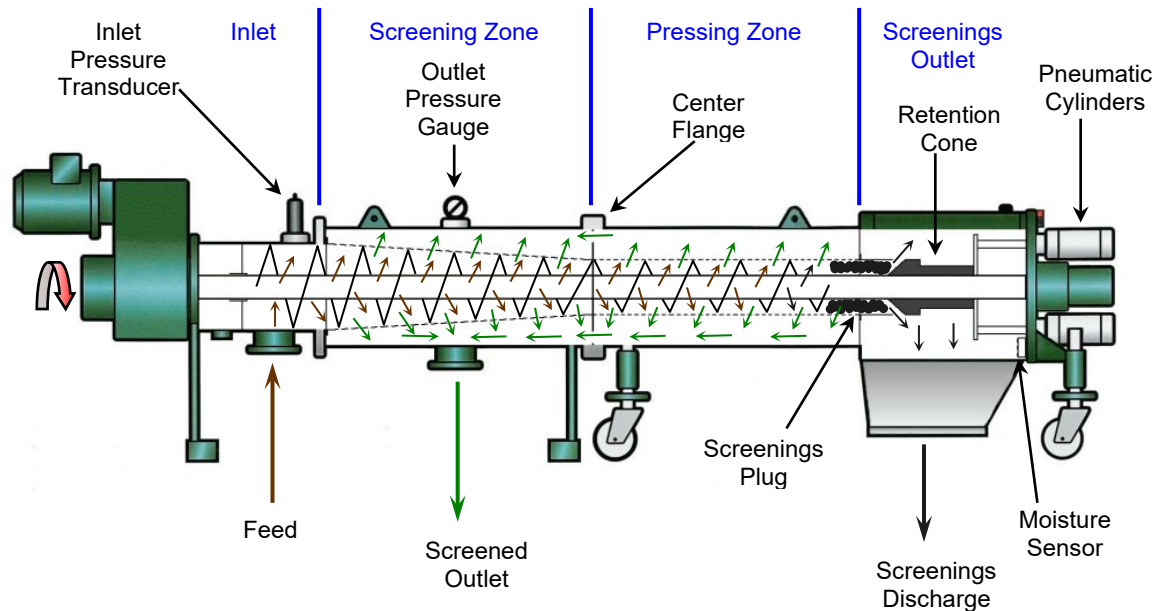


Figure 3.a: Functional Diagram

The main elements of the machine are the geared motor, integral screws, pre-determined perforated mesh screens and retention cone, which regulates the discharge of the screenings.

There are two interfaced screws driven by an efficient geared motor arrangement, sized to accommodate the full range of typical sludge's expected, such that the full capacity of the motor is never exceeded. The first screw is the screening zone, the other is the pressing zone.

As the feed is fed into the inlet of the machine, the screen starts to blind and the pressure inside the machine increases. This pressure is detected by the inlet pressure transducer, which starts the machine, once the start pressure set point is met (default - 0.1 bar). As the Archimedean type screening zone screw conveys the fluid, particles larger than the chosen perforation of the mesh screen are retained. These are then conveyed by the screw to the pressing zone. Free fluids passing through the mesh are discharged from the machine via a flanged outlet connection fitted at the bottom of the machine in the screening zone body and progress onto the next process.

The remaining material is compacted in the continual action of the pressing zone screw. The discharge of solid matter is controlled by the retention cone situated at the end of the pressing zone. The retention cone initially serves as a seal inside of the machine, until the screenings plug is formed. The retaining force of the cone is continually adjusted by a relationship between the drive load of the motor and control pressure. As the plug increases, the drive load increases and the corresponding control pressure (cone opening pressure) is increased, balancing the cylinder pressure (cone closing pressure), allowing the screenings plug to push back the cone and screenings to be discharged.

The discharged plug is gradually broken up against the retention cone, by the continual action of the cone opening and closing against the nozzle. These pieces are then normally collected in a skip or enclosed bagging

unit, situated under the machine for final disposal. If a failure occurs and the plug is lost, resulting in a sludge break-through, the moisture sensor inside the discharge box will detect this and immediately stop the machine, and so long as the correct interlocks are in place, then the feed should also be stopped.

Once the pressure at the inlet drops below the set point, the machine continues to run for a preset run-on time (default - 2 minutes) to clear the machine. If the pressure rises above the set point, the machine will run as normal and the run-on timer is reset.

As a guide to the normal operation of the machine:


- The drive load of the machine at idle (i.e. No load, feed or plug) should be 20-25%, depending on the individual machine characteristics.
- The optimal inlet pressure is 1 - 1.2 bar (14.7 - 17.4 psi) with trip point at 1.5 bar (21.8 psi), however the machine will operate as long as a pressure greater than the start pressure set point is maintained.
- The pressure differential between the inlet and outlet should be between 0 and 0.4 bar (0 to 5.8 psi).

A major benefit of this machine is that there is no requirement for washing or back flushing of the machine.

The degree of separation of solid matter is a condition of the selection of the screen perforation size (available in 2 - 10 mm), which also influences the quantity of screenings produced.

It is our experience with municipal sewerage sludge that an average of approximately ½ gallon of screenings is produced per cubic yard of feed sludge.

With regard to the Hydro-Sludge™ Screen's location in the process, Figure 3.b shows a typical arrangement. The feed can either be pumped, fed by a tanker truck, or both. The addition of a reception tank can provide benefits in balancing the flow to the machine, for both consistency and flow rate.

 **The requirement for the installation of a stone trap prior to the machine is dependent on the specific site conditions. However, where fluid is likely to contain grit and/or stones, it is strongly recommended.**

The screened outlet is recommended as an open gravity discharge, however an elevated discharge of up to 3 yards is acceptable. However, the start pressure must be adjusted to overcome the back pressure.

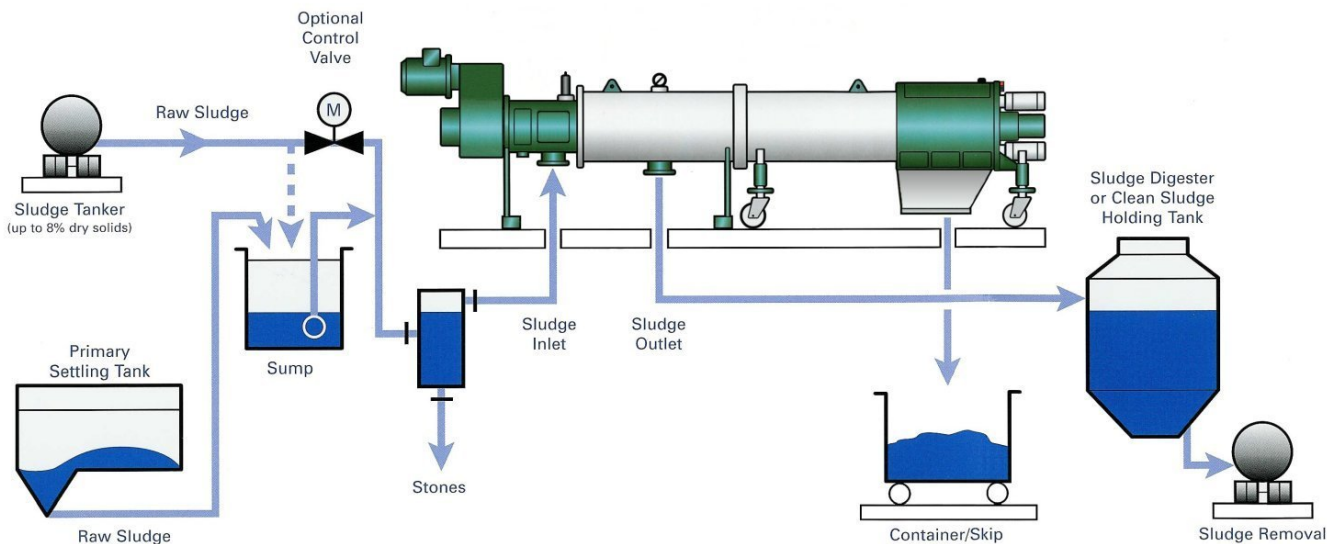


Figure 3.b: Typical Hydro-Sludge™ Screen Process

Capacity of the Machine

The throughput of the machine depends upon many factors such as: -

- The viscosity of the fluid being processed.
- The flow rate at which the fluid is being fed to the machine.
- The size, shape and quantity of the solid matter (screenings load) within the fluid to be processed.
- The perforation size of the machine screens.
- The condition of the machine (i.e. setting up and maintenance of the machine).

The capacity data is given in section 9.0 - Technical Data, and provides a guide to the possible throughputs.

Optimum Operating Conditions

The following are conditions that assist the Hydro-Sludge™ Screen to perform at its optimum, when treating sludge:

- Where the feed is pumped, we recommend that the pumps are selected from the centrifugal range, using a non-clogging, vortex impeller.
- Sludge should be limited to a maximum of 6% dry solids concentration.
- Normal inlet operating pressure should be kept at between 1 and 1.2 Bar (14.5 – 17.4 psi).
- Outlet pressure is variable depending upon feed pressure, sludge thickness, screen perforation size and outlet pipework configuration, with typical pressure loss through the machine up to 0.5bar.
- Where applicable, the machine should be protected against freezing conditions. This may involve heat tracing and lagging.
- The clearance between the screening zone screw and screen should be as small as possible, (almost touching). (**Note** - This will have been set during factory testing before shipment or at commissioning)

Environmental Issues

At the end of the machine's serviceable life, most of its components can be dismantled and recycled.



*Always ensure that current laws, regulations, legislation and directives for disposal are adhered to.
When dismantling the machine for disposal, take care to identify the materials correctly.*

Table 3.a provides a guide to the key components materials of a standard machine.

Table 3.a: Hydro-Sludge™ Screen Materials

Material	Parts
Stainless Steel	Screening Zone and Pressing Zone Screens Pressing Zone Screw, except for keyed stub shaft Inspection lid hinges on the screenings discharge cover Adjusters and lock nuts for the wheels on the Pressing Zone body Pressure Transducer adapters Clutch Rod Turning piece Discharge chute Intermediate ring Gearbox Collar All nuts, bolts and washers
Mild steel	Screening Zone and Pressing Zone bodies and supports Screening Zone Screw flights and main shaft Pressing Zone Screw keyed stub shaft Screening discharge cover Inlet box access opening covers Inlet box access plate Screw shaft covers, either end of the machine Intermediate Flange
Cast iron	Inlet and Discharge boxes Nozzle inside Discharge box Bearing Housing and cover Gearbox housing
Aluminium	Pneumatic cylinder casings Pneumatic cylinder adaptors Motor body Cladding for the trace heating & lagging
Bronze / Brass	Stuffing box follower Thrust shim Cutting Ring Lubrication ring Lock Nuts on Pressing Zone Screw
Plastics / Rubbers	Screening discharge inspection cover handle Retention cone Roller wheels Pneumatic air lines and coils O-Rings and gaskets
Oil	Gearbox, Cyclo and Helical sections
Other grease / lubricants	Grease pipes to retention cone and gland packing seal.

Section 1

Installation / Removal of the Hydro-Sludge™ Screen

Installation

Following delivery, after careful removal of any packaging materials, the machine should be checked for damage and prior to installation, Hydro International must be notified immediately if any damage is found.

To install a machine for the first time or following repair, the following instructions must be followed:

- Lift the machine into position using appropriate and certified lifting equipment, such as a crane, ensuring that the machine is lifted using its lifting lugs. See Figure 4.a.



Lifting from any other position, or the use of straps around the body, could result in damage being caused to the machine and / or risk of injury to personnel. If the machine is heat traced and lagged, care should be taken not to dent or damage it.

- Once in position, ensure that the machine is upright and level. Bolt the screening zone section of the machine to its supporting medium, i.e. steel platform or concrete slab, via the two fabricated supporting brackets.
- Adjust the four wheeled support legs to align the longitudinal axis of the screening and pressing zones using the nuts on the spindles.
- Connect a drain hose, if required, to the 2" hose tail located on the underside of the inlet casting.
- Connect feed and discharge pipework to inlet and outlet flanged connections on the machine.
- If applicable, install any screenings discharge chute, ensuring that a gap is left between the machine chute fixed to the underside of the discharge box and the main discharge chute, to allow the machine to be easily split for maintenance.
- Position the screenings collection system below the discharge chute.
- Carryout the required electrical cabling and connections to the machine device (i.e. motor, pressure transducer, moisture sensor, discharge cover switch and trace heating) where fitted.
- Connect the pneumatic air supply pipes to the ports of the coils from the pneumatic cylinders.
- Once the installation is complete and prior to the commissioning, ensure that the Hydro-Sludge™ Screen is protected from freezing conditions.

Removal

If a machine must be removed for repair, the following instructions must be followed:

- Isolate and lock off all feeds and power supplies.
- Disconnect all cables, pipework and pneumatics.
- Unbolt the screening zone section of the machine from its supporting medium (i.e. steel platform or concrete slab) at the two fabricated supporting brackets.
- Lift the machine from its position using appropriate and certified lifting equipment, ensuring that the machine is lifted using its lifting lugs. See Figure 4.a.



Lifting from any other position, or the use of straps around the body, could result in damage being caused to the machine and / or risk of injury to personnel. If the machine is heat traced and lagged, care should be taken not to dent or damage it.



ALWAYS USE THE MACHINE LIFTING LUGS TO LIFT THE MACHINE.

Note! The angle between the lifting chains / straps should be between 30° & 90°.

It is important that when larger angles are used that the chains / straps have been correctly tested before use.

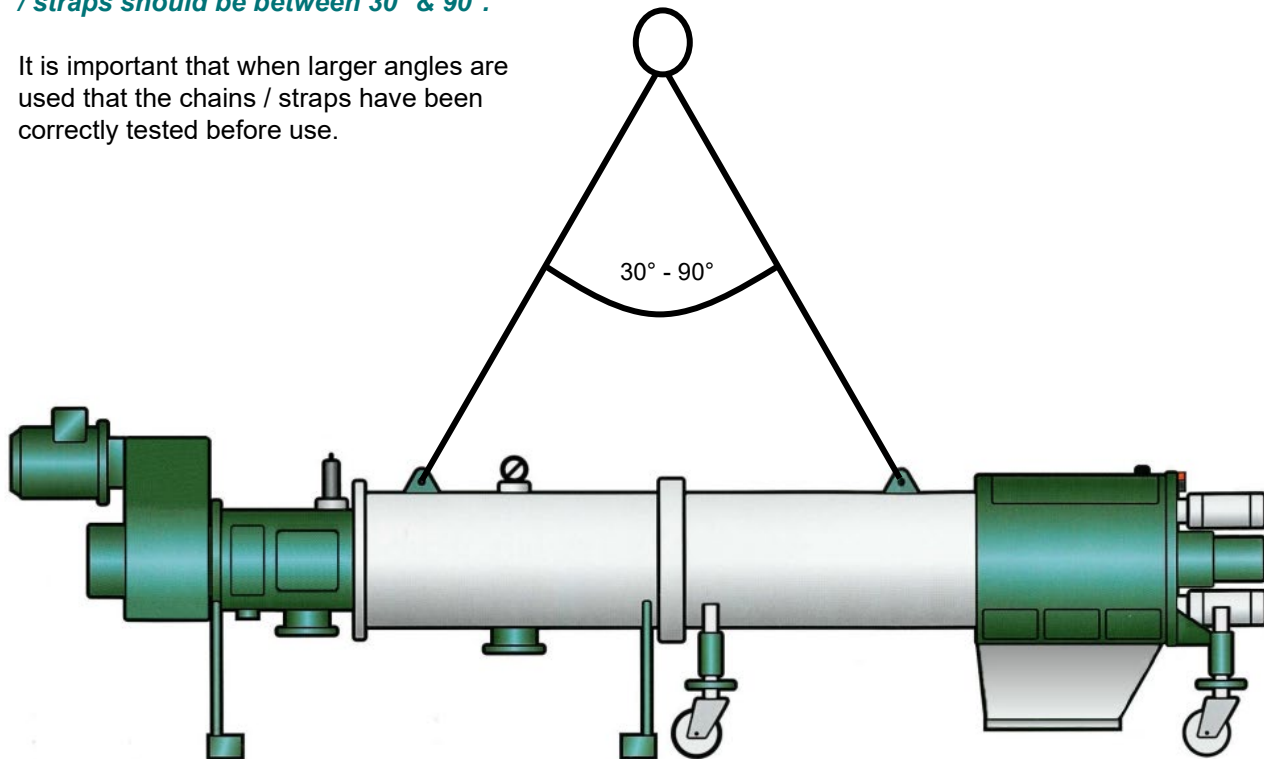


Figure 4.c: Lifting Arrangement



ALWAYS ENSURE THAT THE HYDRO-SLUDGE™ SCREEN IS BALANCED WHEN LIFTING.

Section 2

Hydro-Sludge™ Screen Start-Up

Where commissioning is not part of the scope of supply for the machine or where the equipment has been re-installed, the following instructions must be followed:



Before starting any commissioning, check that the machine and panel have been correctly installed and securely fixed into place.

The site commissioning should be broken down into dry and wet commissioning.

Dry Commissioning

Checks to be carried out before electrical power is applied

- Check all the Hydro-Sludge™ Screen and control panel wiring and air line connections are made.
- Check the Hydro-Sludge™ Screen rollers are set and tight, adjust as necessary.
- If the inlet box has a gland packing seal, check that a drain is connected to the hose tail on the underside of the inlet box.
- Ensure that the inlet and outlet pipework is securely connected.
- Check that there is some sort of container below the discharge chute to collect screenings.
- Open the breather on the outlet pressure gauge.
- Check the power feed certificate for the supply.

Checks to be carried out following electrical power switch on to control panel



Do not allow the machine to run for longer than 5 minutes during dry testing.

- Check the power supply into the control panel.
- Switch on the panel isolator, check for successful boot up and select manual mode.
- Check that the compressor starts and charges the reservoir for to a cylinder pressure of about 3.5 bar (50 psi).
- Start machine in manual using the start button and check rotation of the motor in relation to directional arrow on shaft cover. (Clockwise at the gearbox end)
- Check drive load is approx. 20-25%.
- Ensure that the machine stops in manual mode via the stop button and then restarts again.
- Operate the emergency stop switch on the panel. Check that the machine stops. Release the emergency stop, reset the panel and start the machine.
- Operate the emergency stop switch adjacent to the machine (if applicable). Check that the machine stops. Release the emergency stop, reset the panel, and start the machine.
- Open the screenings discharge hatch. Check that the machine stops. Close the screenings discharge hatch, reset the panel, and start the machine.
- Switch the moisture probe override on. Using a wet cloth, wipe the moisture probe. The machine should continue to run. Dry the moisture probe, reset the panel and start the machine.
- Switch the moisture probe override off. Using a wet cloth, wipe the moisture probe. Check to ensure that the machine stops. Dry the moisture probe, reset the panel, and start the machine.
- Check the span of control air to ensure that the control and cylinder pressures are equal at maximum drive load (default 80%).

Wet Commissioning

- Set the machine to auto and start the sludge feed. Note - It is advantageous to have reasonably thick sludge for commissioning as this helps produce a plug quickly.
- Check that the panel is monitoring pressure and the machine starts at set point (default 0.1 bar or 1.5 psi).
- Once the machine is full of sludge, stop the feed, recheck the drive load (approx. 20-25%) in manual and adjust as necessary. Record drive load and amperage.
- Measure and record the position of the screw, dimensions L_s & L_p . Dimension sum should be same as result for Factory Test.
- Restart the system. It is likely that some sludge will spray into the discharge box, as the plug is forming, which may trip the machine. If this happens, the moisture detector should be switched to override during the start-up operation and the panel reset. Once returned to normal operational mode, the moisture detector override can be switched off.
- Make a record of the pressure values at both the inlet transducer and outlet gauge. The pressure differential should be between 0-0.4 Bar (0-5.8 psi).
- Make a record of the drive load and amperage with sludge.

Note - Once the plug is formed, screenings will start to discharge. Initially they may be wet but will dry with time, which could be up to several hours depending upon the type and condition of the sludge.

- If Gland Packing: Tighten stuffing box follower, until there is only a slight drip from the seal.
- If Mechanical Seal: Check that the mechanical seal has a good seal with no leaks.
- Stop the sludge feed and check that the inlet pressure drops below the set point and that the machine runs on for the preset time (default 2 mins). If the pressure does not drop below the set point, check the outlet pipework for static head and adjust to compensate. If the start pressure is adjusted, record the new setting.
- Start the sludge feed again and check that the machine starts, particularly if the set point was adjusted.
- If possible, induce an inlet pressure of over 1.5 bar and check that the machine trips. Then reset the panel. Note - If there is no interlock between the machine and sludge feed, there is a risk of blowing out the plug.
- Continue running sludge through the machine to check the general operation.
- Carry out and record any necessary fine adjustments of the pneumatic panel (i.e. cylinder pressure, control pressure span etc.).

Data Collection

The following is important data that should be recorded and entered onto the record data sheet, which can be found in the appendix, section 11.2.2:

- Position of screw. (L_s / L_p)
- Drive load and Amperage at idle. (No load, feed or plug)
- Pressure values and differential during processing
- Drive load and Amperage during processing. (Under Load, with feed and plug)
- Approximate sludge throughput in yd^3/hr

This data will be the datum settings, which will eventually change during the machine's working life.

It is therefore important to take further readings, recording them on the record data sheet, as this will indicate the performance and condition of the machine, and whether any maintenance is required.

It would also be useful to record the following data to indicate performance of the machine.

- % dry solids of the sludge. (This will have to be laboratory measured from samples taken.)
- % dry solids of the screenings. (This will have to be laboratory measured from samples taken.)

Section 3

Hydro-Sludge™ Screen Maintenance and Troubleshooting

Maintenance Schedule

The schedule for the key maintenance tasks, associated with the Hydro-Sludge™ Screen are shown in Table 6.a.



Before commencing any maintenance on the Hydro-Sludge™ Screen, always ensure that the machine has been isolated from the electrical supply and feed supply, as appropriate, to ensure that no accidental starting can occur.

Throughout this section of the manual, the various components of the Hydro-Sludge™ Screen are referred to by item numbers, which can be found on the Spare Parts Lists and Drawing in the appendix, section 11.1.2.

Table 6.b: Maintenance Schedule

Activity	Weekly	Monthly	Quarterly	Semi-Annually	Annually
Grease discharge end - retention cone (see section 6.1.1, p2).	•				
Grease inlet end - shaft seal (see section 6.1.3, p2).	•				
Grease discharge end - bearings (see section 6.1.2, p2).		•			
Grease inlet end - shaft lubrication (see section 6.1.4, p2).		•			
Carryout screw adjustment (see section 6.4, p7).		•			
Check moisture sensor (see section 4, p4).		•			
Check gland seal packing (see section 6.2.2, p4).		•			
Check wearing parts (see section 6.2.6, p5).		•			
Check discharge cover safety limit switch (see section 6.2.3, p4).		•			
Check pneumatic system (see section 6.2.4, p4)		•			
Clean & inspect screening zone (see section 6.2.5, p5).		•			
Check gearbox oil levels (see section 6.1.6, p2).			•		
Carry out metal work checks (see section 6.2.7, p5).				•	

Clean & inspect pressing zone (see section 6.2.5, p5).				●	
Clean & inspect all bearings (see section 6.1.5, p2).					●

The above scheduled is based on regular usage throughout an 8-hour day, 5 days a week. If the usage of the machine is higher or the sludge content particularly coarse, then the frequency of the tasks should be increased accordingly.

For maintenance details of the control panel, refer to the O&M for the control system.

Lubrication

The Hydro-Sludge™ Screen has four (4) grease nipples fitted to the external surface of the machine (see Figure 6.a, p 15) to facilitate easier maintenance. (For recommended grease types, see Table 6.b):

1.1.1 Discharge End - Retention Cone

A grease nipple is fitted at the discharge end of the machine, which provides grease to the retention cone and shaft interface. This requires the application of four (4) strokes of a grease gun, once a week.

1.1.2 Discharge End - Bearings

A grease nipple is fitted at the discharge end of the machine into the bearing assembly of the pressing zone screw. This requires the application of two (2) strokes of a grease gun, once a month.

1.1.3 Inlet End - Shaft Seal

A grease nipple is located at the bottom of the inlet chamber of the machine, which provides lubrication direct to the shaft seal fitted in this location. This requires the application of six (6) strokes of a grease gun, once a week

1.1.4 Inlet End - Shaft Lubrication

A grease nipple is fitted to the gearbox joining plate and requires application of two (2) strokes of the grease gun, once a month.

1.1.5 Bearings

The main bearings are filled with grease before shipment. However, all bearings should be cleaned, inspected, and recharged with grease annually.

1.1.6 Gearbox

The gearbox has two oil compartments, one for the Buddybox, filled from the top (oil filler / air vent) and one for the Cyclo portion, also filled from the top (oil filler / air vent).

An initial oil change after the first 500 hours is highly recommended.

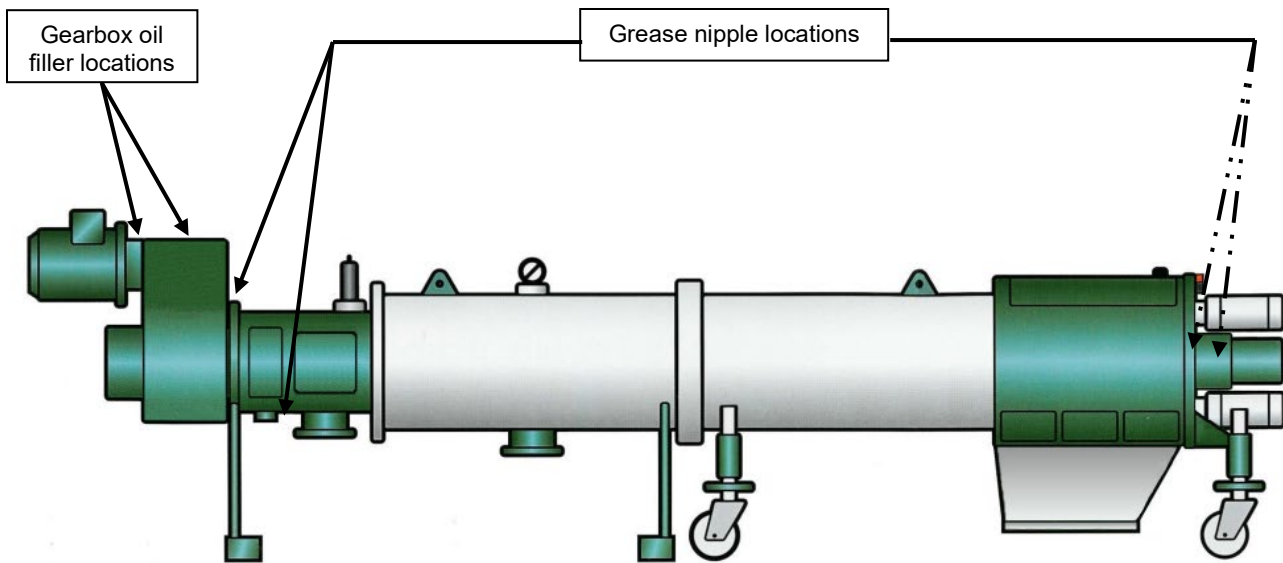
Thereafter, all oil levels should be checked at least every 5000 hours.

The oil should be changed at a minimum interval of 10,000 hours.

For further information and details on the recommended types of oil, see Table 6.c, and for full details, including oil viscosity class chart, refer to the Sumitomo Buddybox information in the appendix, section 11.3.1.

For reference, the units are usually filled with Shell Omala HD220, however refer to the Build Log to check specifically.

Figure 6.d: Lubrication Points on the Hydro-Sludge™ Screen



----- Indicates that the grease nipples may be on the other side of the machine, depending on the orientation.

Table 6.c: Recommended Grease Types

Manufacture	Type of Grease
Shell	Alvania R3
	Alvania RA
BP	Energrease LS3
Esso	Beacon EP or 325
Total	Multis Special 3
Mobil	Mobilux EP3

Table 6.d: Recommended Types of Oil for the Gearbox

Manufacture	Type of Grease
Shell	Omala
BP	Energol GR-XP
Castrol	Alpha MW
Esso	Spartan EP
Total	Carter EP
Mobil	Mobilgear

Inspections and Checks

There are many components to the Hydro-Sludge™ Screen that need to be checked and inspected regularly, as detailed below:

1.1.7 Moisture Sensor

Once a month check the operation of the moisture sensor, item 47:

1. Ensure the machine is switched off and cannot be started accidentally and that the moisture override switch is in the 'Off' position.
2. Clean the sensor front face and dry off.
3. Check the operation of the sensor by pressing a wet cloth against the sensor. The panel should display and moisture fault and it should not be possible to start the machine from the control panel in either 'Auto' or 'Manual' mode.
4. Return the Hydro-Sludge™ Screen to normal operation.

1.1.8 Gland Seal Packing

Once a month the seal packing, item 56, must be checked:

- Ensure that the machine is switched off and cannot be started accidentally.
- Remove both access covers, items 260, either side of the inlet casting.

Note - If casting contains a significant amount of sludge, check drain water discharge hose for blockages.

- Adjust both M12 Nuts, items 151, to tighten stuffing box follower, item 50, onto the gland packing, there should be a very slight dripping from the gland, to ensure it remains moist.
- If no further adjustment is possible, the gland packing will need to be replaced. Back off the stuffing box follower, item 50, remove and the old packing and replace with new, item 56, then refit the stuffing box follower.
- Refit access covers, item 260.
- Return the Hydro-Sludge™ Screen to normal operation.

1.1.9 Discharge Cover Safety Limit Switch

Once a month check the operation of the limit switch, item 27:

- Open the discharge cover, item 256. The panel should display a fault and prevent operation of the machine.
- Inspect the switch, checking that there is no damage and that the opening for the actuator, item 28, is clear and clean.
- Close the discharge cover and reset the panel fault.

1.1.10 Pneumatic System

Once a month the operation and condition of the Hydro-Sludge™ Screen side of the pneumatic system, i.e. the pneumatic cylinders, items 25, the pneumatic tubing, item 286 and coils, items 194 & 195 must be checked:

- Check the pneumatic tubing and coils are free from damage and there are no air leaks.
- Operate the cone reversal system on the panel.
- Open the discharge cover, item 256 and check that the retention cone, item 22, is fully back.

- Close the discharge cover, reset the panel, and turn off the cone reversal.
- Open the discharge cover and check that the retention cone is fully home into the nozzle, item 157.

1.1.11 Screening and Pressing Zones

The machine should be split and opened once a month (see section 6.5), with the screening zone cleaned and inspected for damage and wear, including the screening zone screw and screen (see section 6.6). Then every six months the pressing zone should also be cleaned and inspected for damage and wear, including the pressing screw and screen (see section 6.6).

1.1.12 Other Wearing Parts

There are many smaller wearing parts in the Hydro-Sludge™ Screen, which should be checked and inspected once a month, as part of the general maintenance:

- Thrust Shim, item 1 - Check condition whilst machine is split for screening zone checks.
- Intermediate Flange, item 21 - Check condition whilst machine is split for screening zone checks.
- Cutting Ring, item 2 - Check condition when the retention cone is reversed to check pneumatic system.
- Retention Cone, item 22 - Check condition, particularly the sloped leading face, when reversed to check pneumatic system.

1.1.13 Metal work protection

1.1.13.1 Hydro-Sludge™ Screen

Every 6 months the Hydro-Sludge™ Screen external and where possible internal paintwork should also be inspected for corrosion.

Any areas found to be affected, should be wire brushed and repainted.

1.1.13.2 Platform

If the scope of supply for the installation includes a platform on which the Hydro-Sludge™ Screen is mounted, this also requires regular inspection.

All platform steelwork is hot dipped galvanized to BS EN ISO 1461 and needs to be examined every 6 months for corrosion.

Any areas found to be affected, should be wire brushed and cold galvanized.

Screw Measurement Check

Before carrying out the screw adjustment or splitting the machine, as detailed in the following sections, it is advisable to carry out a screw measurement control check (see Figure 6.b for an overview), to obtain the individual machine L_s & L_p sum, so the machine can be reassembled with the confidence of knowing the screws are correctly pulled together and it enables the wear of the screening zone screw to be assessed:

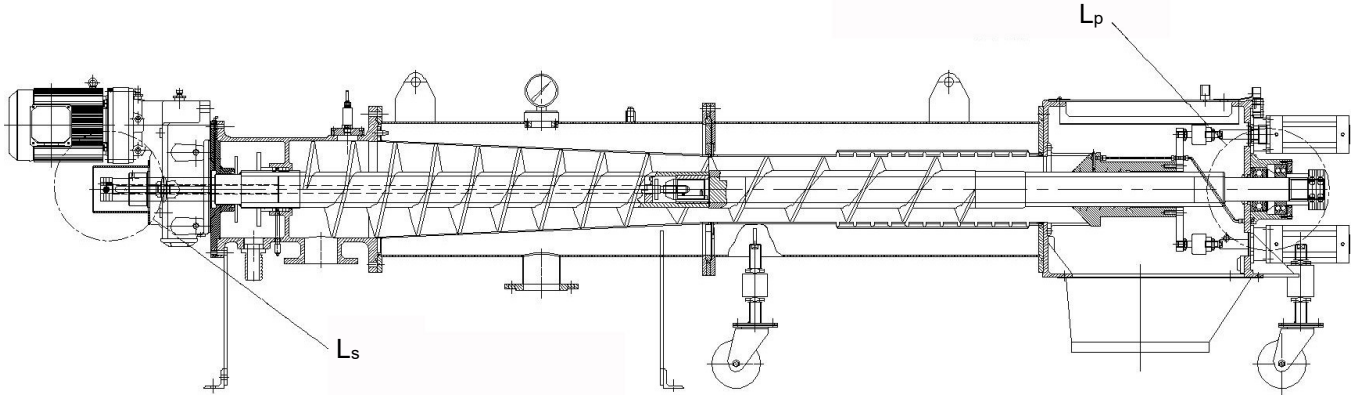


Figure 6.e: Screw Measurement Control Check Overview Drawing

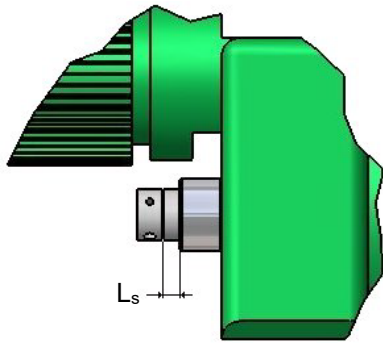


Figure 6.f: L_s Measurement

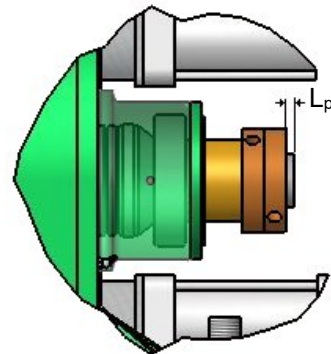


Figure 6.g: L_p Measurement

- Ensure that the machine is switched off and cannot be started accidentally.
- Remove both screw covers, items 240 and 152 to expose the screw ends.
- Measure L_s and L_p as shown. The sum of these dimensions should always be constant for a set of screws and screens in a machine, i.e. approx. 40-55 mm (1.6-2.2 in.).

Note - This will also serve as a check to ensure that both screws are bolted tightly together.

- When measuring L_s always ensure that the gearbox mounting collar assembly, item 358 is hard up against the gearbox. When measuring L_p the two lock nuts, items 15, must be locked together tightly against distance bush, item 76.

Note - A spare screening zone screw & screen should be ordered once $L_p = 40$ mm (1.6 in.), as maximum adjustment is approximately 50mm (2.0 in.) and delivery time can be up to 8 weeks.

Adjustments for Wear of Screening Zone Screw and Screens

1.1.14 General

To keep the machine in optimum operational condition, it is important to keep the clearance between the screening zone screw and screen at a minimum (almost touching). This should prevent the screen from becoming blocked and thus keep the machine operating correctly.

As the screw and screen becomes worn with use, the clearance increases, and the machine performance is reduced. This will be noticed by either a reduction in throughput quantity and screenings discharge volume and/or by an increase in inlet pressure, as observed on the control panel.

The clearance between the two is adjusted by drawing the screw into the screen, along its longitudinal axis, using the adjusting nuts fitted to the pressing zone screw, which is attached to the screening zone screw via a tie rod.

When $L_p = 50$ mm (2.0 in.), no further adjustment of the screw will be possible, and it will require replacing with a new screw and we would recommend changing the screen as well.

1.1.15 Discharge Plug Clearance

Prior to any adjustment of the screws, the compacted screenings (plug) at the discharge needs to be removed. This is to ensure that there is no restriction of the screw movement and that the drive load is at its minimum, no load point.

The plug is removed as follows: -

- Isolate the inlet and outlet for the machine, to ensure there is no flow to the machine.
- Move the Selector Switch from “Auto” to “Rev” and the retention cone will reverse to allow access to the plug.
- Run the Hydro-Sludge™ Screen, using the Start / Stop buttons for 2-3 minutes to drive the plug forward.
- Stop the Hydro-Sludge™ Screen.
- Open the discharge cover and dig out as much as possible of the plug.
- Close the discharge cover and reset the machine.
- Repeat 3 - 6 until no more plug is driven forward and the end of the discharge is clear.
- Return the Hydro-Sludge™ Screen to ‘Auto’ and re-instate the feed.

1.1.16 Screw to Screen Clearance Adjustment

To carry out adjustment of the screw to screen clearance, follow the steps below: -

- Clear the discharge plug, see 6.4.2.
- Ensure all incoming flows are Isolated.
- Run the Hydro-Sludge™ Screen in ‘Manual’ Mode for up to 2 - 3 minutes until the drive load of the machine, as observed on the control panel, remains fairly constant. Take a note of this reading. If the reading is less than the optimum of 20-25 %, adjustment is required.
- Switch off the Hydro-Sludge™ Screen and isolate it against accidental operation.
- Remove the screw covers items 240 and 256 and unscrew the outermost lock nut, item 15 on the pressing zone screw, using the adjusting bars, items 216.
- Loosen grub screw, item 204 in the gearbox collar, item 358.

- Tighten the innermost lock nut, item 15, ¼ of a turn to draw the screws towards the discharge end of the machine. Each 1mm increase in L_p reduces the clearance between the screening zone screw and screen by 0.10mm on the diameter. Therefore, 50mm (~2 in.) on L_p equates to 5mm (~3/16") change in diameter.
- Start the machine in 'Manual' mode and observe the drive load on the control panel. If this reading remains constant within the optimum range, then adjustment is complete. Otherwise, repeat the adjustment from step 4 above.



The screw must never be adjusted to the extent that grinding noises can be heard from within the machine, or the drive load increased grossly from optimum, otherwise the screw and screen will become prematurely damaged. This would also result in the control pressure of the retention cone being incorrectly set by the automatic control system.

- Stop the machine and tighten the outermost lock nut against the innermost lock nut, to prevent any movement of the nuts.
- Measure L_s and L_p again and record the measurements in the record data sheet (see appendix, section 11.2.2).
- Ensure the gearbox collar, item 385 is hard up against the gearbox, then tighten grub screw, item 204.
- Start the machine in 'Manual' mode and observe the drive load on the control panel and check that the reading has not changed and is still within the optimum range. If the reading has dropped, repeat adjustment from step 4. If the reading has increased, slightly loosen the lock nuts, items 15, and run the machine for up to 5 mins, until the drive load returns to the optimum range; then check the lock nuts are tight and ensure the gearbox collar, item 385 is hard up against the gearbox.
- Refit the screw covers, items 240 and 256.
- Reset the Hydro-Sludge™ Screen and feed supply back into 'Auto' mode.
- The machine is now available for use.

Splitting the Machine

For various maintenance purposes, cleaning, inspection and spares replacement, it is necessary to start by splitting the Hydro-Sludge™ Screen to provide access to the inside of the machine, see Figure 6.e below for reference.

- Isolate the inlet and outlet for the machine, to ensure there is no flow to the machine.
- Switch off the Hydro-Sludge™ Screen and isolate it against accidental operation.
- Remove screw covers items 240 and 256.
- Measure L_s and L_p and make a note in the record data sheet (see appendix, section 11.2.2). This is important as these measurements are used to check that the machine has been re-assembled correctly.
- Loosen the lock nuts, items 15, using the adjusting bars, items 216.
- Unscrew and remove the three M12 fixings, item 145, that bolt the halves of the machine together.
- Unscrew the grub screw, item 204, in the turning piece, item 10.
- Using an adjusting bar located into turning piece, item 10, unscrew in a clockwise direction, to release the clutch rod, item 8 from the pressing zone screw, until the machine halves separate.



The clutch rod has a left-handed thread.

- As the pressing zone is located on casters, it can now be disconnected and moved aside, providing access to both the screening and pressing zones.

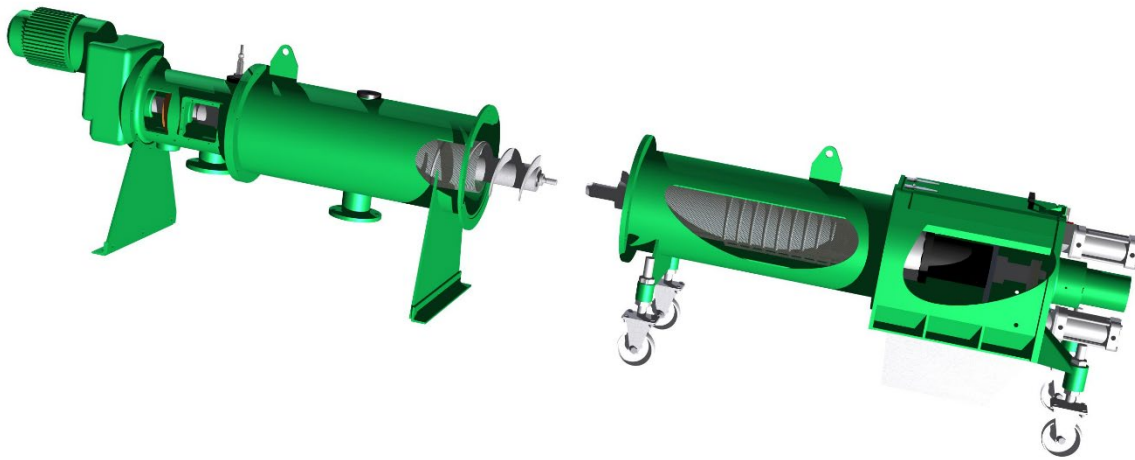


Figure 6.h: Split Hydro-Sludge™ Screen

Screws and Screens Removal.

1.1.17 Removal of Screening Zone Screen.

- Having split the machine as described in section 6.5. Unscrew the ½" BSP plug, item 150, fitted to the inlet casting. This provides access to the screening zone screen flange, to assist in removal of the screen.
- Insert a bar through the exposed hole and tap the bar gently to dislodge the flange of the screen from its locating lugs within the body of the machine.
- The screen can now be manually removed from the machine.

Note - Always clean and inspect the screen before re-assembly.

1.1.18 Removal of the Screening Zone Screw.

- Having removed the screening zone screen as described in section 6.6.1. Remove turning piece, item 10, from the drive shaft, by unscrewing the M12 securing screw, item 205.
- Remove the grub screw, item 204 from the gearbox collar, item 358, and withdraw the collar from the drive shaft.
- Unscrew and back off the stuffing box follower, items 151 and 50, to release the gland packing.
- Working from the middle of the machine, remove clutching rod, item 8, from the screw.
- Carefully withdraw the screening zone screw from the body of the machine, taking care as the diameter varying shaft sections pass through the stuffing box.

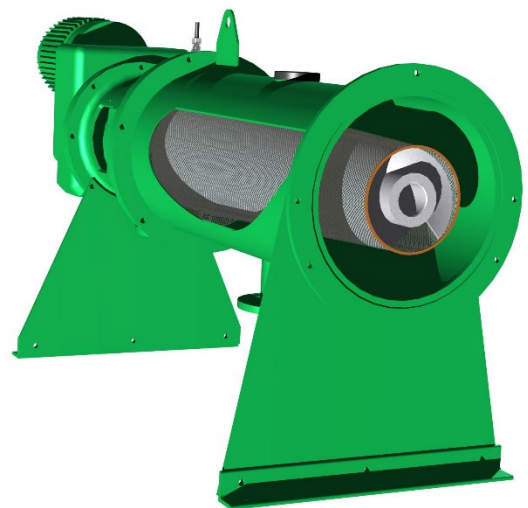


Figure 6.f: Split Hydro-Sludge™ Screen - Screening Zone Section

Removal of Pressing Zone Screw.

Note - Due to the nature and action of the machine some solid matter will remain within the screw and screen area of the pressing zone. In some instances, it may be necessary to remove both the screw and screen together and separate them once out of the machine.

- Having split the machine as described in section 6.5. Unscrew both lock nuts, items 15, from the screw shaft and remove the distance bush, item 76.
- From the center of the machine, carefully withdraw the screw from the body of the machine, taking care as the diameter varying shaft sections pass through the bearings, within the bearing housing, item 258. Also protect the threaded shaft section of the screw from damage and take care not to lose the cutting ring, item 2 from the front of the retention cone, item 22.

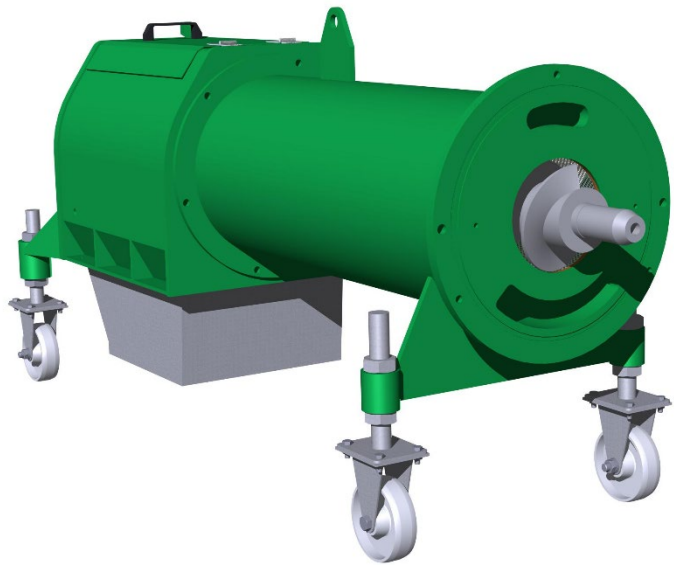


Figure 6.g: Split Hydro-Sludge™ Screen Pressing Zone Section

1.1.19 Removal of the Pressing Zone Screen.



It is important never to remove the screen before the screw, as the screen helps to support the screw as it is removed from the machine.

- Having removed the pressing zone screw as described in section 6.6.3. Remove the intermediate flange, item 21, together with the thrust shim, item 1, by unscrewing the two M8 countersunk fixings, items 139, which secure it in place.
- Unscrew the three M8 countersunk fixings, items 140, holding the pressing zone screen to the machine body.
- Inset the two screen removal tee handles, items 217, into the screen flange and pull the screen from the body. The screen has a support cage welded to the back half of the screen, which must be aligned with slots in the body of the machine to fully remove it.

Note - Always clean and inspect the screen before re-assembling it.

Re-assembly of Screens and Screws

1.1.20 Re-assembly of Pressing Zone Screen.

- Working from the center of the machine, place the screen into the body, with the 'V' cut out in the flange uppermost and the bars on the cage of the screen aligned with the slots in the body flange. Carefully slide the screen into the machine, pushing it back until the flange and cage lugs locate into the back-body flange of the machine. (Assistance may be required to locate the screen, from inside the discharge box.)
- Refit the three M8 countersunk fixings, items 140, to secure the screen to the body.
- Check the condition of the O-rings, items 39, in the intermediate flange, item 21, and replace if necessary.
- Refit the intermediate flange and secure using two M8 countersunk fixings, items 139.

- Check that the thrust shim, item 1, is correctly located in recess of the intermediate flange.

1.1.21 Re-assembly of the Pressing Zone Screw.



It is important that the screen is refitted before the screw, as the screen helps to support and guide the screw back into place.

- Before refitting the screw, make sure that the cutting ring, item 2 and v-ring, item 41, (fit new ones, if required) are fitted to the screw shaft. In the case of the v-ring ensure that it is pushed against the shoulder of the next shaft section to protect it whilst the screw is fitted.
- Working from the center of the machine, carefully insert the pressing zone screw into the screen in the body of the machine.
- Push the screw through the machine, taking care to align the retention cone, item 22, and bearings within the bearing housing, item 258, to ensure the screw passes through the machine smoothly.

Note - It may sometimes be necessary to remove the bearings from the housing and to refit them after the screw is back in place.

- Once sufficient thread has been passed through the distance bush, item 76, locate one of the lock nuts, item 15, onto the shaft, until the lock nut outer face becomes flush with the end of the shaft.
- Move the v-ring along the shaft until it pushed up against the inside the discharge box.

1.1.22 Re-assembly of the Screening Zone Screw.

- Working from the center of the machine, carefully insert the screw into the body of the machine and through into the inlet casting. A bar through the center of the screw will be needed to lift the screw into the inlet casting.
- Guide the screw shaft through the gland packing seal, item 56 and the stuffing box, item 50, and re-locate the thrower disc, item 146, onto the shaft.
- Guide the screw through the gearbox. This may require manual rotation of the screw to align the key fitted to the screw, with the keyway of the gearbox.

Note - Ensure the screw is pushed back as far as possible to make the screen fitting easier.

- Place the clutch rod, item 8, through the screw, from the center of the machine.
- Working at the gearbox end of the machine fit the gearbox collar, item 358, to the drive shaft. Do not tighten the grub screw, item 204, at this stage.
- Fit the turning piece, item 10, into the clutch rod and locate the M12 cap head fixing, item 205, through both the turning piece and clutch rod and tighten.

1.1.23 Re-assembly of the Screening Zone Screen.

- Place the screen over the screening zone screw and gently push it back into the machine. Rotate the screen until the three holes in the screen flange are located over the three guide pins, item 280, located at the back of the screening zone body within the machine.



Always ensure that the welded seam of the screen is at the top.

- Via the hole exposed when the ½” plug, item 150, was removed; ensure that the flange of the screen is fully home up against the inlet casting. Re-fit the plug.

Re-assembly of the Split Machine.

- Check the condition of the screw o-ring, item 40, located in the end of the pressing zone screw and replace if necessary.
- Move the pressing zone body to the fixed screening zone body and check the alignment of the locating pins with the holes in the flange.
- Adjust the steering rollers, items 153, if necessary to achieve alignment.
- Locate the clutch rod, item 8, into the pressing zone screw and tighten using the turning piece, item 10 and one of the adjusting bars, item 216, ensuring the key and key way are in alignment.



Remember the clutch rod has a left-handed thread.

- Once the body sections are pulled close enough together, locate the three M12 fixings, items 145, into the central flange and tighten.
- Now fully tighten the clutch rod and lock the grub screw, item 204, in the turning piece, ensuring that the two screws are pulled tightly together.
If the original screws and screens have been refitted, go to 7, else go to 10.
- Working at the discharge end of the machine, tighten the lock nut, item 15, until there is sufficient thread to fit the second nut.
- Fit the outer lock nut and loosely tighten the lock nuts, items 15 and ensure the gearbox collar, item 358 is hard up against the gearbox. Check that the sum of L_s and L_p , equals the sum recorded before splitting the machine (**Note - The individually values may not match, but the sum should**). If the measurements do not match, the screws are not pulled together correctly, so split the machine and re-assembly it again. If the measurements match proceed to the next step.
- Adjust the lock nuts until the distance L_p is about 1mm less than the recorded distance before the machine was disassembled.
- Tighten grub screw, item 204, in the gearbox collar, item 358.
- Check and adjust the machine, until the drive load is within the optimum range of 20-25%, as detailed in section 6.4.3, p7.
- Stop the machine and ensure the outermost lock nut is tight against the innermost lock nut.
- Measure L_s and L_p and record the measurements in the record data sheet (see appendix, section 11.2.2). Ensure that the sum of L_s and L_p is within the range 40-55mm, indicating that the screws are correctly together, or where the original screws and screens have been refitted the values are as recorded before disassembly.
- Ensure grub screw, item 204, is tight in the gearbox collar, item 358.
- Refit the screw covers, items 240 and 256.
- Reset the Hydro-Sludge™ Screen and feed supply back into 'Auto' mode.
- The machine is now available for use.

Removal of Gearbox Motor



The geared motor assembly is a complete unit and it is strongly recommended that the gearbox and motor are only split by the manufacturer, unless fitted with an X-adaptor, and therefore a standard IEC flanged motor.

Where it is recommended to remove the motor, follow the method below:

- Isolate the inlet and outlet for the machine, to ensure there is no flow to the machine.
- Isolate the power to the Hydro-Sludge™ Screen and lock off to protect against accidental operation.
- Electrically disconnect the cable from the motor terminal box, noting terminal positions and numbers.
- Remove the 4 bolts from the motor flange that connect it to the X-adaptor on the gearbox.

- Pull the motor horizontally from the adaptor (which is connected via a keyed shaft), using a lifting device to support the weight.

Re-assembly of Gearbox Motor

- Slide the motor into X-adaptor, using a lifting device to support the weight and ensuring that the motor's keyed shaft locates correctly into the adaptor.
- Refit the 4 bolts to the motor flange.
- Electrically re-connect the motor cable in the terminal box.
- Reinstate the power to the machine.
- Start in manual mode and check the rotation of the screw in relation to directional arrow on casing. (Clockwise at the gearbox end). Correct as necessary.
- If a new or rewound motor is fitted, check the screw adjustment (see section 6.4.3, p7 for details).
- Re-instate the Hydro-Sludge™ Screen and feed supply.

Removal of Geared Motor Assembly

The following details the method for removing the geared motor assembly from the inlet box of the machine:

- Remove screw covers items 240 and 256.
- Run the machine in manual and stop it when the screening zone screw key is top center.
- Electrically & mechanically isolate the Hydro-Sludge™ Screen and feed supply and ensure that it cannot be started accidentally.
- Measure L_s and L_p and make a note to assist with re-assembly.
- Loosen the grub screw, item 204, in the turning piece, item 10. Loosen the turning piece, using one of the adjusting bars, item 216. Remove the M12 cap head fixing, item 205, from the turning piece and remove the turning piece from the clutch rod, item 8.
- Loosen the grub screw, item 204, in the gearbox collar, item 358 and remove the collar from the screw shaft.
- Remove both access covers, items 260, either side of the inlet casting.

Note - If casting contains a significant amount of sludge, check drain water discharge hose for blockages.

- Electrically disconnect the motor cable from the terminal box on the side of the motor, noting terminal positions and numbers.
- Sling around the motor connection flange and secure to lifting device.
- Working through the openings in the inlet casting from the removal of the access covers, remove the 6 no. M16 fixings, item 243.
- Slide the gearbox back off the screw shaft and lower the assembly to the platform floor.

Re-assembly of Geared Motor Assembly

To re-assemble the geared motor assembly:

- Ensure that the keyway in the gearbox is top center. If necessary remove the fan cowl and turn the fan until the keyway is in the correct position, then refit the cowl.
- Sling around the motor connection flange of the geared motor and secure to lifting device.
- Grease the screw shaft to assist with fitting.
- Lift the geared motor assembly up to the screw shaft and slide up to the gearbox plate.
- Working through the openings in the inlet casting from the removal of the access covers, refit the 6 no. M16 fixings, item 243.
- If a new geared motor has been fitted, ensure that the unit is correctly filled with oil.

- Refit the gearbox collar, item 358 on the screw shaft and tighten the grub screw, item 204.
- Refit the turning piece, item 10 onto the clutch rod, item 8. Refit the M12 cap head fixing, item 205, into the turning piece and tighten using one of the adjusting bars, item 216. Tighten the grub screw, item 204, in the turning piece.
- Check the L_s and L_p measurements against those taken before disassembly and adjust screws until the same (see section 6.4.3, p7 for screw adjustment details)
- Refit both access covers, items 260, either side of the inlet casting.
- Electrically reconnect the motor cable in the terminal box on the side of the motor.
- Refit screw covers, items 240 and 256.
- Start machine in manual and check direction of rotation, i.e. clockwise at gearbox end of machine.
- Re-instate the Hydro-Sludge™ Screen, feed supply and check operation.

Hydro-Sludge™ Screen Blockages

Should the Hydro-Sludge™ Screen become internally blocked, the following explains how to locate the problem, enabling it to be removed:

1.1.24 Inlet Casing

If a foreign object has blocked the machine at the inlet point, it is usually possible to remove it via the inlet chamber access cover, item 264:

- Isolate the feed supply and the Hydro-Sludge™ Screen, ensure protection against accidental operation.
- Unscrew the M8 fixings, items 266 from the square access cover on the inlet casing, item 264 and remove to access the inlet end of the screw.

Note - There may be some sludge in the inlet casting, especially if the drain is blocked.

- Remove blockage from inlet, if possible.
- Re-fit access cover.
- Re-instate Hydro-Sludge™ Screen and feed.

1.1.25 Main Body

If the inlet is clear, the blocked will be elsewhere within the main body in the screws and screens. If this is the case, the machine will need to be split in half and cleared from the inside. See section 6.5 for the details of this procedure.

Periods of Shutdown

Where a Hydro-Sludge™ Screen will be left out of operation for a period of time, refer to the following:

1.1.26 In General

The screenings plug should be removed as far as is possible (see section 6.4.2).

The panel should remain powered to allow the panel heater and Hydro-Sludge™ Screen trace heating (where fitted) to operate to prevent damage from the cold.

1.1.27 Less than 2 Months

In addition, the Hydro-Sludge™ Screen should be drained before shutdown, to ensure there is no sludge within the body of the machine and all lubrication points are well greased (see section 6.1).

Before the machine is placed back into operation it should be re-commissioned as detailed in section 5.0, and any issues identified, should be resolved.

1.1.28 Over 2 Months

In addition, for long-term shutdown, the machine should be split (see section 6.5), cleaned, washed, reassembled (see section 6.8) and all lubrication points well-greased (see section 6.1).

Before the machine is placed back into operation it should be re-commissioned as detailed in section 5.0, and any issues identified, should be resolved.

Preventative Maintenance

For the Hydro-Sludge™ Screen, preventative maintenance tasks and their descriptions are indistinguishable from standard maintenance tasks. Please refer to *Section 6 – Maintenance* for preventative maintenance information.

Faults & Remedies

Hydro-Sludge™ Screen Faults

Fault	Cause	Remedy
Decreased throughput capacity	Under adjusted screw, resulting in insufficient screen cleaning.	Check screw adjustment and correct as necessary.
	Thick sludge or high content of dry material.	Dilute feed.
	Feed problem.	Check feed source (i.e. pump or tanker) and feed pipework & valves for blockages.
Increased drive load	Blockage in machine.	Check the machine for blockages.
	Thick sludge or high content of dry material.	Dilute feed or reduce feed flow rate.
	Over adjusted machine, causing screw to screen friction.	Check screw adjustment and correct as necessary.
	Cylinder pressure on retention cone too high.	Check operation/settings of pneumatic system, especially main regulator.
	Control pressure on retention cone too low.	Check operation/settings of pneumatic system, especially E/P Regulator, input signal and general operation.
Sludge break-through	Cylinder pressure on retention cone too low.	Check operation of pneumatic system, especially compressor and check for air leaks.
	Grease content too high, not enough solid or coarse matter to promote a plug.	Check sludge composition.
	Throughput too high.	Reduce feed flow rate.

Fault	Cause	Remedy
	Under adjusted screw, causing screen to blind.	Check screw adjustment and correct as necessary.
	Over adjusted screw, causing increased control pressure.	
Minimal screenings discharge or hard plug	Cylinder pressure on retention cone too high.	Check pneumatic control. Clear the machine if required.
	Under adjusted screw, resulting in insufficient screen cleaning.	Check screw adjustment and correct as necessary.
	Burst screen.	Split machine and check screens.
	Decrease in coarse matter content of feed.	Check consistency of feed.
Noisy operation of the Hydro-Sludge™ Screen	Noise coming from the gearbox. STOP MACHINE !!	Check the oil level in the gearbox and top up if necessary. If the oil level is correct suspect an internal gearbox problem and call an Engineer.
	Noise coming from within the machine. STOP MACHINE !!	Switch off the feed and isolate machine. Open machine and remove screws & screens. Look for damage, foreign matter, such as stones, bricks etc. Check stone trap (if present) for carry over.
Inlet Pressure High (Check inlet / outlet pressure differential)	Differential OK (0 - 0.4 bar) Blockage in outlet pipe.	Check outlet pipework and valves for blockages and clear.
	Differential High (> 0.4 bar) Blocked screen.	Check screen for blockages (e.g. gravel) and screw adjustment.
Failure to start in Auto	Lack of feed pressure.	Check feed pipework for blockages and check operation of feed source.
	Negative pressure inlet pressure.	Install air valve to balance pressure in system.
	Failed inlet pressure transducer.	Check operation of transducer and diaphragm for damage.
Failure to stop in Auto	Back pressure higher than start pressure.	Adjust start pressure to above static back pressure.
	Failed inlet pressure transducer.	Check operation of transducer and diaphragm for damage.

Panel Faults

For faults relating to the panel, i.e. error messages on control unit or fault lamp illumination, see the Control System - User Manual.

Technical Data

Item		Data
Application of use		Sewage sludges
Method of feed arrangement		Tanker delivery or fully centrifugal pumped system
Capacity of throughput *1		Approx. 50 to 120 m ³ /hr
Feed concentration		Approx. 6 to 0-1 % dry solids
Discharged screenings consistency		Approx. 35 - 45% dry solids
Max. Internal working pressure of body		3 Bar
Optimal working pressure (max)		1 to 1.2 Bar
Motor *2	Type	3.0 kW, 3ph, 4 Pole, 415 V, 50 Hz, EFF 1
	Full Load Current	5.89A
	Protection	IP56, Class F, 110V Anti Condensation Heaters
	Connection details	Flange Mounted
Gearbox *3	Type	Direct Drive – Cyclo / Helical with x-adaptor
	Output speed	12 rpm
Screening Zone Screen *3	Perforations	5 mm Ø
	Material	304 Stainless Steel
Pressing Zone Screen *3	Perforations	3 mm Ø
	Material	304 Stainless Steel
Machine weight empty (approx.)		1100 kg.
Noise Level (incl. panel)		74 dB @ 1m at full load (Max.)
Inlet / Outlet Flanges		100mm Ø, PN16
Trace Heating		11W, 110V AC Self Regulating

*1 Figures based on using 5 mm Ø Screening Zone Screen processing sewage sludge, originating from an activated sludge process, which has had 25mm minimum spacing bar screening. It should only be used as a guide, as site specific factors will influence the final performance.

*2 Data is for a standard Hydro-Sludge™ Screen, however machines specifications can vary, therefore refer motor rating plate for the specific information.

*3 Data is for a standard Hydro-Sludge™ Screen, however machines specifications can vary, therefore refer to the Build Log for the specific information.

Section 4

Hydro-Sludge™ Screen Spare Parts

Parts List

A full range of consumable items and spare parts are available.



Only fit genuine spare parts as the use of alternative parts, where available, will invalidate the guarantee and may cause damage to the machine and reduce performance. Non-genuine parts may not have been designed and manufactured to the same strict control levels as our genuine parts.

Consumable Spares - 2 Year Operation

Item	Description	Quantity
1	Thrust Shim	1
2	Cutting ring	1
56	Shaft Seal (Gland seal packing)	1
66	Seal Set – comprises all required seals (34,35,36,37,43)	1
27	Discharge Cover Safety Limit Switch	1

Strategic Spares - 5 Year Operation

The replacement period of these components may vary depending on individual site conditions, i.e. composition of sludge.

Item	Description	Quantity
22	Retention Cone	1
4	Screening Zone Screw (std - MS & 304 st/st)	1
6	Screening Zone Screen	1
14	Pressing Zone Screw	1
16	Pressing Zone Screen	1

NOTE: This relates to the required quantities for the standard Hydro-Sludge™ Screen machine.