



SPIRAC CONVEYOR

INSTALLATION, OPERATION & MAINTENANCE MANUAL

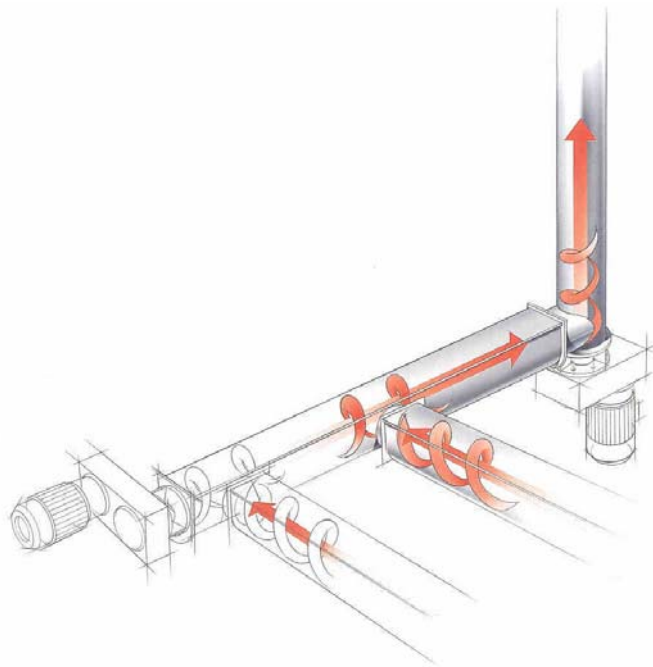
Doc No :

Rev : A

Compiled By :

Date Compiled : 20/07/2006

Project :
SPIRAC Client :
Contract / PO No. :
SPIRAC Project No :



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1.0 INTRODUCTION

1.1 GENERAL

We welcome you as a user of SPIRAC conveyors. Your conveyor is a product of careful engineering and skilled workmanship. We believe you have the best conveyor possible for the service intended. With reasonable care and preventive maintenance it will give you long, efficient, trouble-free service.

Refer to Safety Sheet in section 7.SAFETY.

This manual is furnished to acquaint you with some of the practical ways to install, operate and maintain this conveyor. Read it completely before doing any work on your unit and keep it handy for future reference.

All SPIRAC conveyors are built to convey different types of materials that may be wet, half fluid, sludgy, uneven or hygienically demanding etc. However every conveyor is custom built to give maximum efficiency for the specified material being conveyed. It is not acceptable to convey any product other than that noted in the Specification Sheets.

Any modification, change or rebuilding of the conveyor must be approved in writing by SPIRAC so that machine damage and personal injury are avoided and that documentation is relevant.

Only trained or instructed staff with clearly defined responsibilities for the operation, set up, maintenance or repair on the conveyor should be used.

In the event of any queries please contact your nearest SPIRAC representative.

1.2 PRODUCT IDENTIFICATION

There is one identification plate (ID) on each conveyor. *Figure 1.2a* shows an example of a typical ID plate.

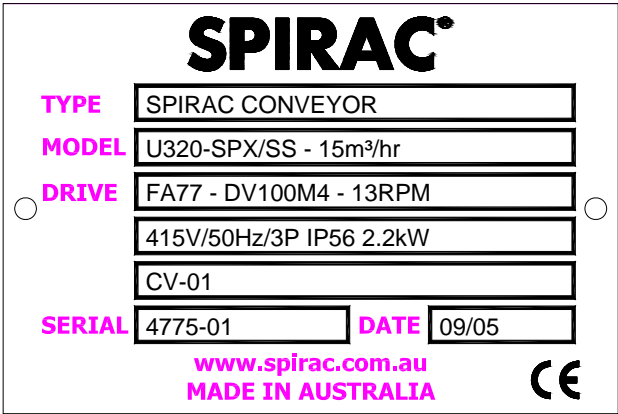


Figure 1.2a

Permanent records for this conveyor are kept by Serial Number and it must, therefore, be used with all correspondence and spare parts orders. The last sequence of numbers is specific to that conveyor and is utilised on orders of more than one conveyor. This sequence of numbers is also the end users equipment tag numbers

1.3 PRODUCT DESCRIPTION

The conveyors' parts can vary in appearance due to the fact that all SPIRAC conveyors are custom built. The figure below (*Figure 1.3a*) shows the principal parts of the conveyor. Drawings of each particular conveyor can be found in Appendix 'General Arrangement Drawings'.

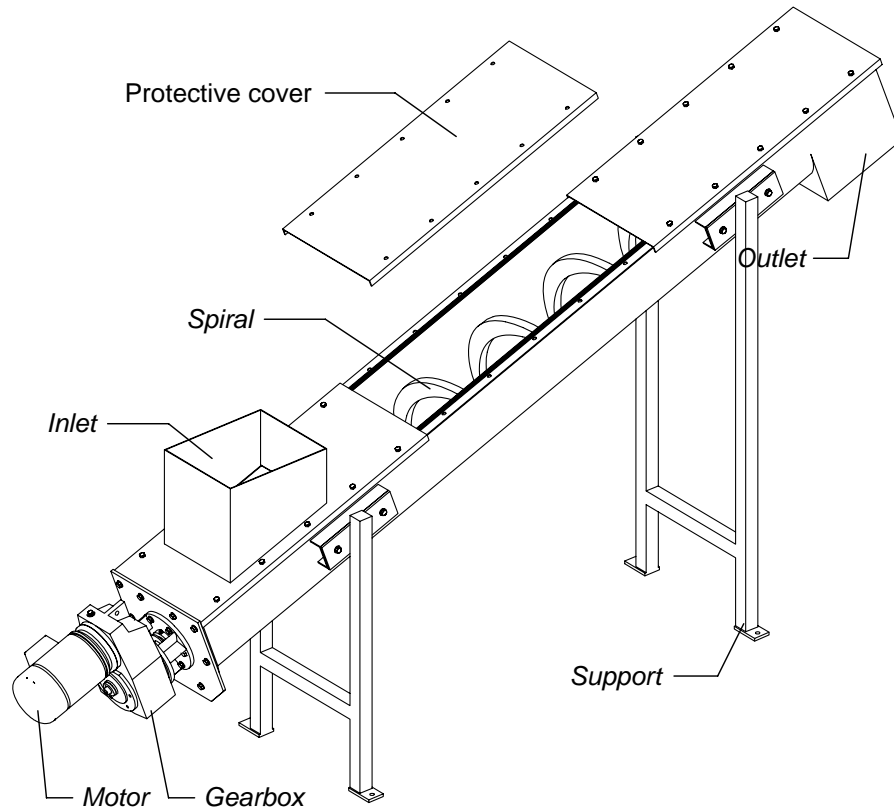


Figure 1.3a - Principal Parts of the Conveyor

The material is fed in/out via one or more inlets/outlets. These can be fitted with covers or slide gates if so required. The inlets/outlets can be mounted to face any direction.

The conveyor moves the material with a rotating steel spiral. The spiral's inclination and diameter are relevant to the material being conveyed. The steel spiral has only one bearing, at the drive end. The spiral is a helix without a centre shaft. This gives the conveyor more space for and less sensitivity to the material being conveyed.

The drive unit can either be pushing or pulling. A pushing drive enables the conveyor to work with materials that tend to snag.

Because the spiral has no centre shaft it is always in contact with the trough when it rotates. A replaceable liner therefore protects the trough. The liners are available in several different materials (plastic, steel, etc.) depending on the material being conveyed. To reduce wear the conveyor should be driven as full as possible.

2.0 INSTALLATION

2.1 GENERAL

These instructions must be carried out in the order stated to prevent machine damage and personal injury.

Check conveyor for shortages and damage immediately upon arrival (an absolute must !). Prompt reporting to the carriers agent, with notations on the freight bill, will expedite satisfactory adjustment by the carrier.

Conveyors are normally shipped from the factory within open sided crates. Gearboxes may either be completely assembled or packed separately for shipping. When the gearbox has been sent separately, fixing bolts will be packaged in a separate container and shipped with the conveyor or attached to the gearbox. Recommended torque settings for the spiral coupling disc and the drive shaft are as follows:

Torque Settings for the Coupling Disc	
A4/70 M12x55	62Nm (oiled thread)
A4/70 M16x55	152Nm (oiled thread)
A4/70 M20x60	296Nm (oiled thread)
Torque Settings for the Drive Shaft	
A4/70 M12x60	20Nm (oiled thread)
A4/70 M16x70	40Nm (oiled thread)
A4/70 M20x80	80Nm (oiled thread)
A4/70 M24x90	200Nm (oiled thread)

Before the conveyor is installed its dimensions must be checked against the dimensions on the installation drawing.

Make sure the inlets/outlets to the conveyor are angled to suit the conveyors inlets/outlets.

The foundation must be substantial enough to absorb vibration (recommendations of the foundation to weigh at least 5 times the weight of the conveyor). The foundation must form a permanent and rigid base for the conveyor supports. This is important in maintaining the alignment of the conveyor trough.

Check to make sure that there are drains if these are required.

2.2 ASSEMBLING THE TROUGH

If the conveyor is so long that the trough has been delivered in several sections these should be assembled first. If the trough is already assembled then continue to *Sect. 2.3*.

1. Lay out the trough sections in a straight line on a flat surface.
2. Check that the trough-sections are positioned in the correct order. The trough-ends are marked with letters to show the order in which they should be assembled.
3. Make sure that the sealing strip or gasket is placed between the trough-sections.
4. Fix the trough-sections together with the bolts, nuts and washers provided (see *Figure 2.2a*)

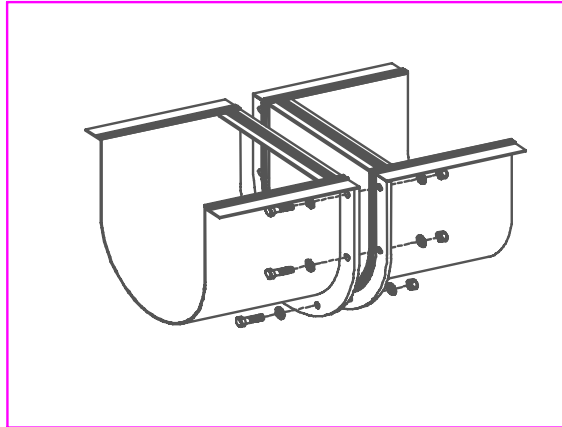


Figure 2.2a - Assembling the trough

2.3 CONNECTION OF SPIRALS

This procedure requires welding, see *Section 2.8 “Welding”* before commencing to weld. Sometimes the spirals are delivered longer than required and must therefore be cut to the length specified in the drawing. The spiral should be cut at right angles to its axis. After this the edges should be ground and angles cut where needed (see Appendix ‘Welding Procedure’ if applicable).

If the spiral is delivered in several sections it must be welded together. If the spiral does not need welding go onto *Sect. 2.4*.

1. Centre the spiral sections in the trough using heavy wooden blocks or steel profiles. Check e.g. with a tri-square that the spiral sections are in line before they are welded together.
2. Weld alternately on both sides of the join.
3. Grind the weld *carefully* to remove sharp edges and uneven-ness.
4. Prime coat (steel spiral) or passivate (if SS spiral) weld area as detailed in *Sect. 4.4*.
5. Replace the trough’s protective cover.

2.4 MOUNTING THE DRIVE ASSEMBLY

Occasionally the drive assembly is delivered not attached to the conveyor. If your conveyor has the drive assembly sent separately, it is delivered ready to be attached. If the conveyor is to work in a raised position it is better to mount the drive unit with the conveyor on the ground.

1. Remove the transport lock from the spirals' drive shaft.
2. Remove the tape holding the key to the drive shaft.
3. If the drive shaft is not stainless steel it is treated with rust inhibitor. Use degreaser to remove this.
4. Remove the cover from the motors cooling fan so that the drive shaft can be turned using the fan.
5. Turn the drive shaft so that the key-way comes to the right position for the spirals' drive shaft and then push the gearbox onto the drive shaft.
6. Bolt the gearbox to the bell housing flange with the bolts, nuts and washers provided (see *Figure 2.4a*).

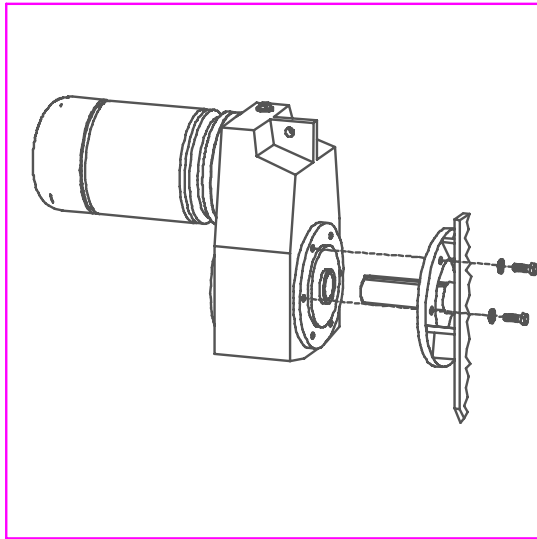


Figure 2.4a - Mounting the Drive Assembly

7. Fasten the locking bolt, spring washer and stepped spacer to the spirals drive shaft in order to fasten this in the gearboxes drive bore (see Fig 2.4b). When the spiral's drive shaft is firmly positioned in the drive bore the locking bolt should be tightened to the torque specified (refer Sect. 2.1).

NOTE - The spiral must be pushed back towards the drive so that the locking bolt can be threaded into the drive shaft.

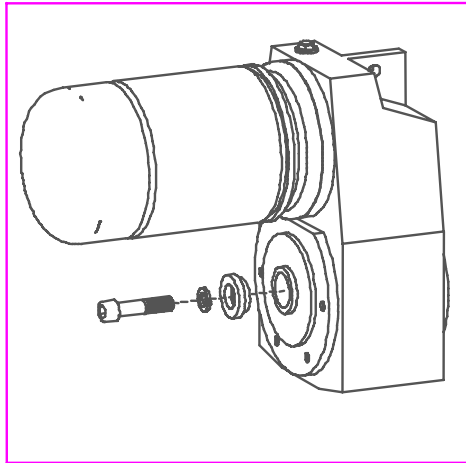


Figure 2.4b - Fastening the Motor

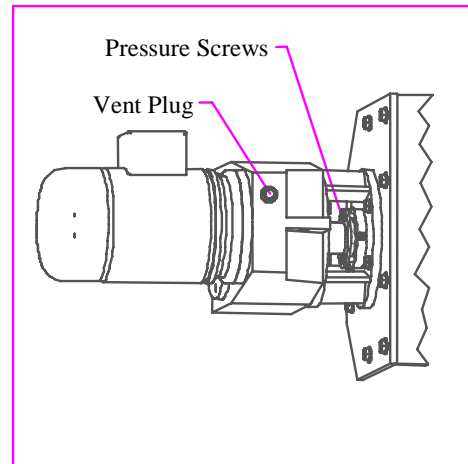


Figure 2.4c-Tightening the Pressure Screws

8. Tighten the pressure screws until the gap between the packing box and the gland is only about 7mm wide. Tighten the screws alternately and check the gap is even after the screws are tightened (see Fig 2.4c).
9. Fill the packing box with grease (see Sect. 4.3).
10. Replace the cooling fan cover to the motor.
11. Remove the screw on the top of the gearbox and attach the vent plug that is provided. (If not already done so.)
12. Check level of oil in the gearbox (see Appendix 'Lubrication Check Sheet' for position of filler plug).

2.5 CONNECTION TO SUPPORT STRUCTURE

All conveyors are fitted with support brackets welded to each side of the conveyor trough. These brackets are pre-slotted and positioned in the factory prior to shipment. If supports are supplied with the conveyor –

1. Make sure no one is standing beneath the trough while it is being lifted or mounted.
2. Lift the conveyor so that it assumes its operating position.
3. Fasten the supports to the support brackets (numbered for identification) utilising the bolts, nuts and washers provided.
4. Make sure the conveyor is sufficiently anchored to the floor to withstand any working loads.

NOTE - If the conveyor is supplied with slide gates they should be attached before the conveyor is raised. If the conveyor is at working height it is possible to attach the slidegate after the supports are attached.

2.6 ELECTRICAL

Conveyor component manufacturers generally do not provide electrical equipment to control the conveyors. In selecting electrical control equipment to be used with any conveyor installation, the purchaser must use equipment conforming to the local electrical regulations. Consideration should be given to some or all of the following devices and to others that may be appropriate.

- Overload Protection - Devices such as electronic shear pins, torque limiters and so forth are used to shut off power whenever operation of the conveyor is stopped as a result of excessive material, foreign objects, excessively large lumps and so on.
- No-Speed Protection - Devices such as zero speed switches to shut off the power in the event of any incident that might cause the conveyor to stop operating.
- Safety shut off switch with power lock-out provision at conveyor drive.
- Emergency stop switches readily accessible whenever required.
- Electrical inter-locking to shut down feeding conveyors whenever a receiving conveyor stops.
- Signal devices to warn personnel of imminent start-up of conveyor, especially if started from a remote location.
- Special enclosures for motors and controls for hazardous atmospheric conditions.

2.7 WELDING

When welding it should be noted that the steel is affected by heat. Overheating should therefore be avoided. If welding stainless steel ensure that the consumable material is as resistant to corrosion as the parent metal. The consumable should therefore contain as much alloy as the parent metal. Welding together two dissimilar materials should be avoided due to the risks for hair-line fractures, reduced weld strength and a greater propensity to corrode due to electrolytic action.

The weld surfaces should be degreased with acetone (or an equivalent solvent) immediately prior to welding. The material should be degreased at least 60mm from the weld surface.

The following electrodes should be used for arc welding;

<i>ELECTRODE TYPES</i>	
OK 4800	For spirals of special steel (the electrode dimension should be at least 2mm to avoid overheating).
OK 4800	For mild steel or HTMAS.
OK 6130	For stainless steel.
OK 6330	For acid resistant stainless steel to mild steel (or to HTMAS).
OK 6333	For stainless to mild steel (or to HTMAS).

Suitable electrode sizes are 2.0 to 3.25mm depending on where the weld is placed.

If your conveyor is delivered in sections, it will be necessary to weld the spiral. Refer to instructions in 2.3 and Appendix 'Welding Procedure' for the correct procedure.

For weights of conveyors see Appendix 'General Arrangement Drawings'. Weights are shown under Notes on each Drawing.

3.0 OPERATION

3.1 PRE-START CHECKS

Only persons completely familiar with the safety aspects (as detailed in Sect. 7.0) should be permitted to operate the conveyor. The operator should thoroughly understand these instructions before attempting to use the conveyor. Failure to follow these precautions may result in serious personal injury or damage to equipment.

Before the initial start-up of the conveyor, make the following inspections;

1. Check to make sure the gearbox is securely fastened to the conveyor drive plate.
2. Check all connections to the motor and starting device with the wiring diagram. Check the voltage, phase and frequency on motor nameplate.

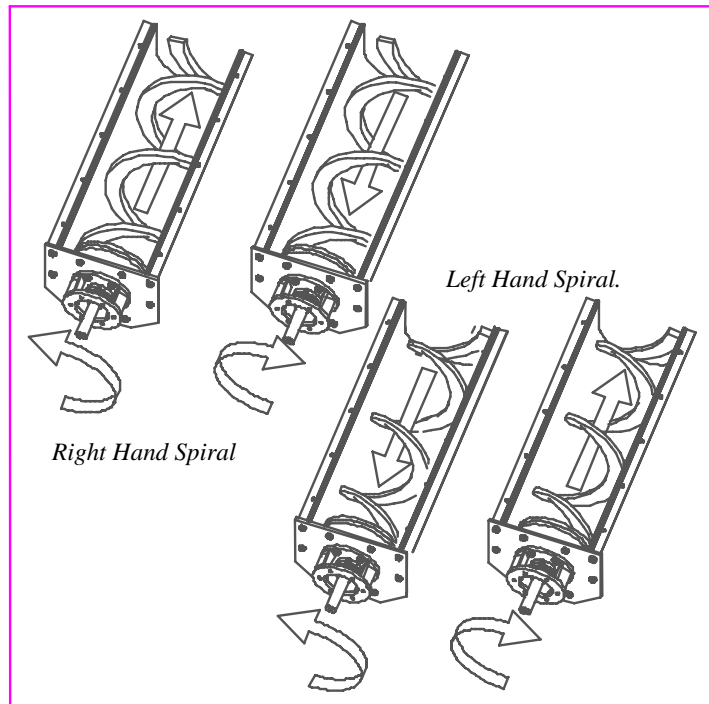


Figure 3.1a - Direction of Rotation

3. Remove motor cooling fan cowling and rotate spiral via fan to ensure that it rotates freely. At the same time check spiral rotation and that material will flow towards outlet.
4. Check gland packing box adjustment, lubrication and piping (if supplied).
5. Check gearbox lubrication level.
6. Make sure all covers, guards and safety equipment are properly installed.

3.2 OPERATIONAL CHECK-LIST

The following should be used upon initial start-up and after extended shut-down periods.

1. Operate conveyor empty for 1-2 hours, making a continuous check for heating of gearbox bearings and noisy operation.
2. Check that the discharge of the conveyor is clear before feeding any material.
3. Increase feed rate gradually until rated capacity is attained.
4. Stop and start conveyor several times, and allow to operate for several hours.
5. Shut off conveyor and lock out power supply. Remove covers and check coupling bolts for tightness.
6. Replace covers.
7. Ensure material is “flowing” in the correct direction.
8. Make certain that the conveyor controls (e.g. motion sensor, slide gates) are interlocked correctly and functional.

3.3 EXTENDED SHUT-DOWN

If the conveyor is to be inoperative for a long period of time, it is advisable to permit it to operate for a period of time after the feed has been cut-off in order to discharge as much material as possible from the trough. The trough should be cleaned completely after the conveyor is shut down and the power locked out.

Conveyors that are shut down during freezing conditions should be protected by one of the following methods;

- Empty the trough completely.
- Insulate the conveyor to prevent the material from freezing.

4.0 MAINTENANCE

4.1 GENERAL

Generally it is necessary to establish routine periodic inspections of the entire conveyor to ensure continuous maximum operating performance. Practice good house keeping. Keep the area around the conveyor and drive assembly clean and free of obstacles to provide easy access and to avoid interference with the function of the conveyor or drive.

Always –

1. Follow the established local regulations and/or procedures for isolation of equipment.

Or-

2. Lock-out power to motor before doing any maintenance work preferably with a padlock on control panel or isolator.
3. Do not remove padlock from control, nor operate conveyor, until covers and guards are securely in place.

4.2 PACKING GLAND ADJUSTMENT

Packing gland bolts should be evenly adjusted so they are little more than finger tight. Over tightening of the packing gland may result in premature packing failure and possible damage to the shaft and gland.

When packing is new, frequent minor adjustments during the first few hours (if material being conveyed is very fluid) of operation are recommended in order to compress and seal the packing.

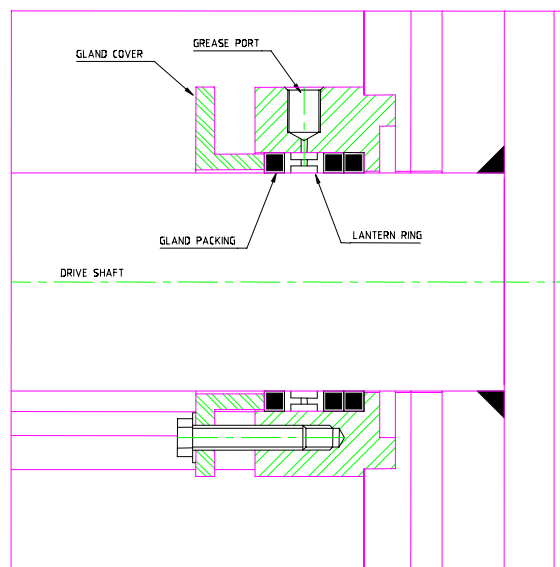


Figure 4.2a - Packing Box Arrangement

4.3 LUBRICATION

Please refer to the Appendix 'Lubrication Check Sheets' for Grease and Oil types for your particular conveyor.

4.4 SURFACE COATING

This section describes how the conveyors surfaces should be treated, if made of stainless steel or not. The materials of construction for your particular conveyor are specified in the Appendix 'Conveyor Data Sheets'.

Operation in sewage treatment plant or damp environments exposes the conveyor to air that may contain chemically or biologically corrosive particles. In these cases painted, galvanised and stainless steel surfaces can be damaged. It is therefore important that personnel follow the operating instructions and remedy any corrosion or damage to coatings as soon as they occur.

Standard Procedure for Surface Repair

- **Painted**

In the standard manufacturing procedure the conveyors trough and protective cover are sandblasted to Class 2-½ as per AS1627.4 and then prime coated with a two component red oxide zinc phosphate epoxy polyamide to give a dry film thickness (DFT) of no less than 75µm. The final coat shall be a two component epoxy polyamide to give a DFT of no less than 175µm. The coating shall be sufficiently cured for re-coating within 24 hours at 25°C.

Final colour to be Blue Grey N53 (or as specified by client) as shown in AS2700.

To ensure long equipment life it is important that the coated surfaces are maintained to prevent rust that can cause serious damage in a short space of time.

Rust may be ground back to bare metal and the surface carefully cleaned before it is covered by the above or an equivalent rust protective coating.

- **Hot Dip Galvanised.**

The conveyor trough and protective cover have been Hot Dip Galvanised to AS1650 and AS1214.

Rust may be ground back to bare metal and the surface carefully cleaned before application of a suitable "Cold Galvanising" agent.

- **Stainless Steel.**

The materials used are 304 or 316SS (refer to Appendix 'Conveyor Data Sheets'). These materials do not need any special treatment but the following should be observed.

Grinding or welding in close vicinity of the conveyor must be avoided. Showering sparks onto the stainless steel can cause a rust brown discolouration.

All stainless steel surfaces must be handled so that the corrosive resistance is not impaired. As a minimum the stainless steel should not come into contact with steel of other qualities during transportation or assembly. Wood, cloth or plastic should be used to pad the stainless steel when lifting or transporting the conveyor.

The heat input during welding leads to the formation of chromium oxides on the steel surface. The underlying material is depleted of chromium, increasing the risk for corrosion. Passivating removes the oxides, scale and slag. The surface is cleaned to bare metal and a thin protective layer, or "passive" layer, is built up. This restores optimal corrosion resistance and ensures that the weld will have the longest possible life.

4.5 MAINTENANCE TIME TABLE

The following checks outlined below are recommendations only. They can be adjusted to suit the operation time of the conveyor or incorporated into existing site maintenance procedures.

PREVENTIVE MAINTENANCE	
PERIOD	ACTIVITY
Weekly	Check bell housing packing box temperature with a thermometer, not by hand. If over 60°C it may be due to lack of grease.
	Check for any unusual vibration or noise. Locate and rectify.
Monthly	Clean the conveyor inside and outside (if necessary). This is usual if the conveyor has been standing idle for long periods.
	Check the liner for wear. If yellow backing is showing through replace damaged section.
	Check gland packing box for leaks (if very moist materials). Re-tighten if necessary.
	Check the spiral for any excessive wear or unusual damage. A maximum of 20% of the spirals original sectional dimension can be worn away before it requires replacement. If the spiral is extremely long (>15m) it should be replaced before this level is reached.
Half Yearly	Check all fasteners (supports, trough connections etc.).
	Check all trough welds.
	Check the oil level in the gearbox and its colour. If the oil is heavily emulsified (cream-like) there is water in the oil. Rectify and replace.
	Check the control system, i.e. emergency stops, sequential control etc.

5.0 SERVICE

5.1 REPLACING THE GLAND PACKING

1. Empty conveyor of all material.
Unscrew the gland cover screws and slide the cover back along the drive shaft.

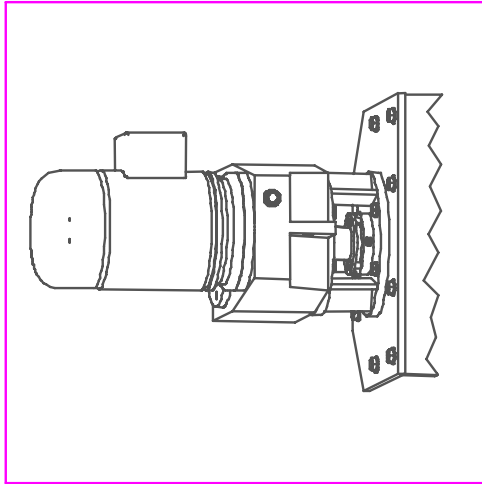


Figure 5.1a - Gland Cover Screws

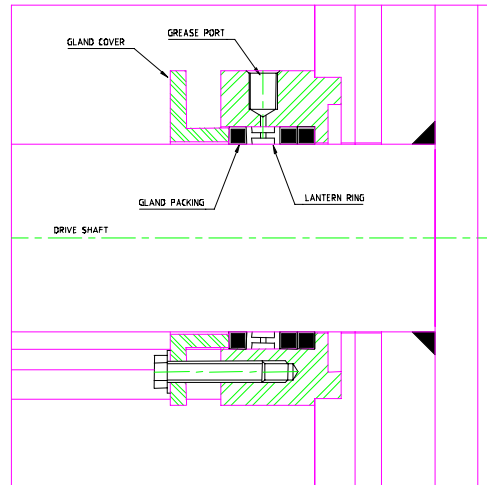


Figure 5.1b - Packing Box Assembly

2. Remove the packing and clean the packing box seats.
3. Cut the new packing with an angle (45 Degrees). Put tape around the packing before it is cut to prevent the ends from fraying.
4. Push the new packing into the packing box seat cut ends first.
5. Repeat this process for the other packs. Check that each is in place before the next is put in. The packs should be rotated by 90° to each other so that the joints are in different places.
6. Replace the gland cover and tighten the screws so that the packing is properly formed in the packing box seats.
7. Lubricate as per the Appendix 'Lubrication Check Sheets'.
8. Test run the conveyor with material to make sure the packing box does not leak.

5.2 REPLACING THE LINERS

Depending on what is to be conveyed the conveyor can be lined with different materials. There are three different types of liners -

- Plastic or UHMW Polyethylene
- Steel Bar
- Steel Plate

Technical data concerning the liners steel and plastic qualities is specified on the drawings.

Liners can often be replaced without the spiral being totally removed. However servicing is easier without the spiral in the trough.

Replacing the Plastic Liner -

The new plastic liners are either delivered ready shaped or flat. The shaped liners should not be removed from their packaging until immediately before they are to be fitted. Once the liner has been removed from its packaging it takes only one hour for it to become flat and needs reshaping.

1. Empty the conveyor of material. Unfasten the lid and remove or push it back from the trough (see Fig 5.2a).
2. Unfasten the nuts on the coupling disc bolts holding the spiral to the coupling disc.
3. Remove the spiral from the trough or lift it to increase accessibility (see Fig 5.2b).

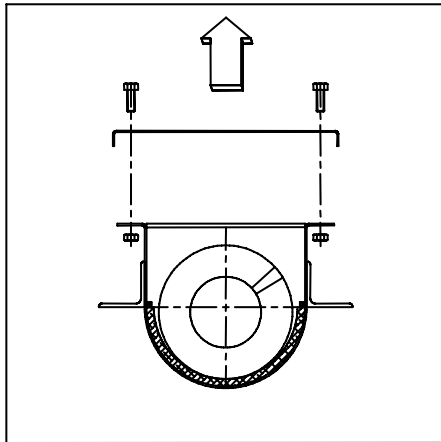


Figure 5.2a - Taking off the Cover

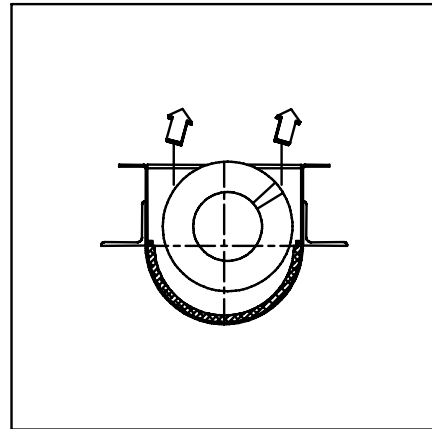


Figure 5.2b - Lifting the Spiral

4. Insert a heavy duty screw driver or lever down between the trough and the plastic liner so that it releases from its steel block retainers (see Fig 5.2c).
5. Take hold of the liner and pull it out (see Fig 5.2d).

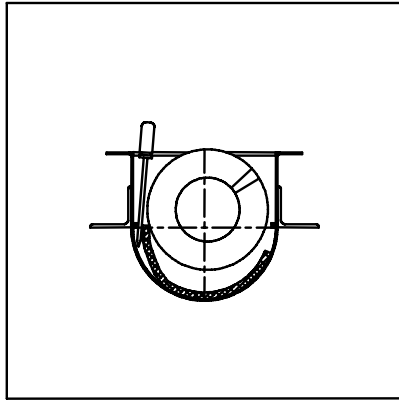


Figure 5.2c - Levering Out the Liner

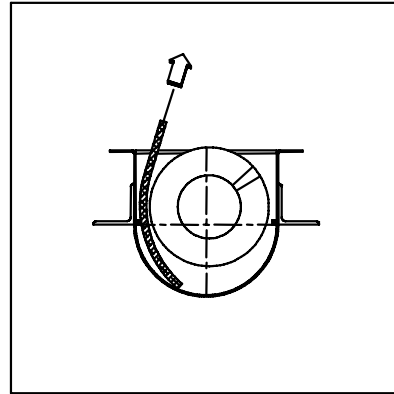


Figure 5.2d - Pulling Out the Liner

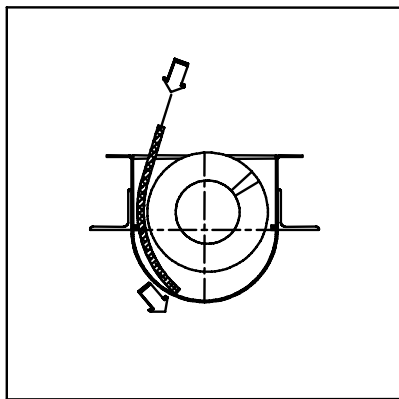


Figure 5.2e

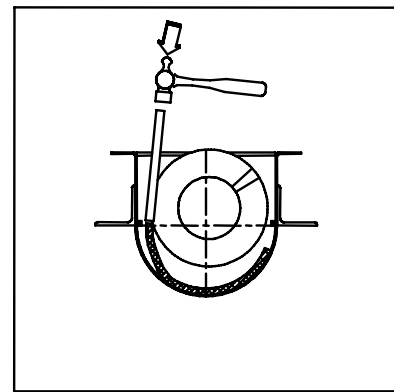


Figure 5.2f

6. Push the new liner under the spiral, making sure the wear indicator strip is at the bottom. It is important to secure the liner under the retainer blocks on each side of the trough (Figure 5.2e & 5.2f).
7. Replace the bolts holding the spiral to the coupling disc.
8. Replace the lid to the trough (Figure 5.2g).

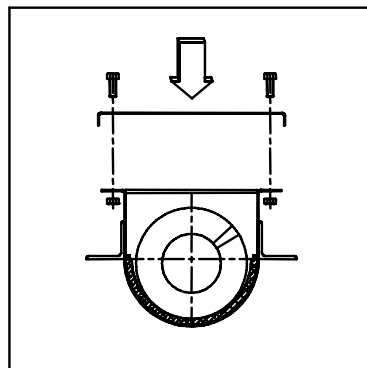


Figure 5.2g Replacing the Liner

Replacing the Steel Bar and Steel Plate Liner -

This section describes the replacement of both steel bar and steel plate liners.

The majority of the steps are common to both procedures. Where the steps differ, this is noted in the text. This procedure requires welding. See *Section 2.8 "Welding"* before commencing to weld.

1. Unfasten the lid and remove or push back from the trough.
2. Unfasten the nuts on the coupling disc bolts holding the spiral to the coupling disc.
3. Remove the spiral from the trough or lift it to increase accessibility (fig 5.2h).

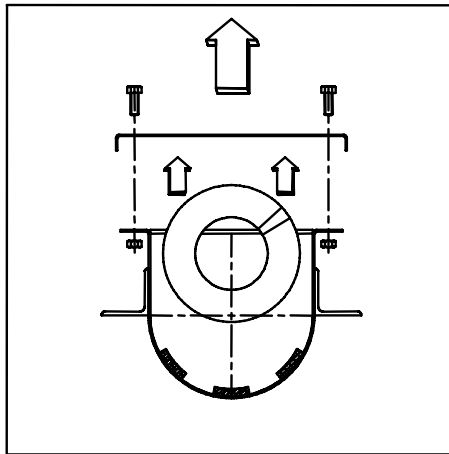


Figure 5.2h - Taking off the Cover, Removing the Spiral

4. Use a grinder to grind away the welds from both sides of the steel bars (or steel plate liner) and remove the bars (liner) from the trough.

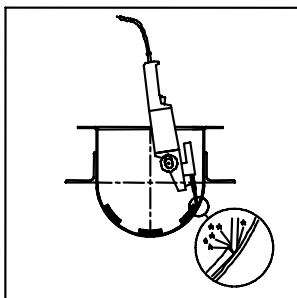


Figure 5.2i

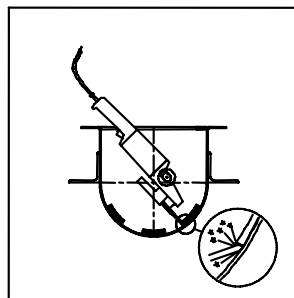


Figure 5.2j

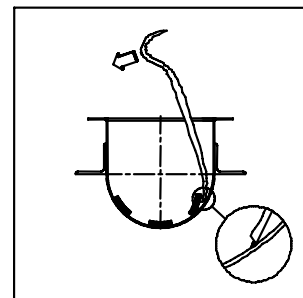


Figure 5.2k

5. Grind the surfaces clean where the old welds were positioned.
6. Degrease the surfaces (with acetone or a similar solvent) to prepare for the new steel bars (liners).
7. Take a new steel bar (steel plate liner) and fasten it in the position of the old one.
8. Check that the bars are all in line.

9. For steel plate liner:-place welds opposite each other along the length of the trough.
For steel bars:- Put welds (75run/250pitch) along the length of the bar. The welds should alternate from the left to the right hand side of the bar (125pitch). Make sure the ends of the bars are welded to the trough (fig 5.2l).
10. Repeat this procedure for the other steel bar liners.
11. Replace the spiral to the trough and fasten it to the coupling disc.
12. Replace the protective cover to the trough (fig. 5.2m).

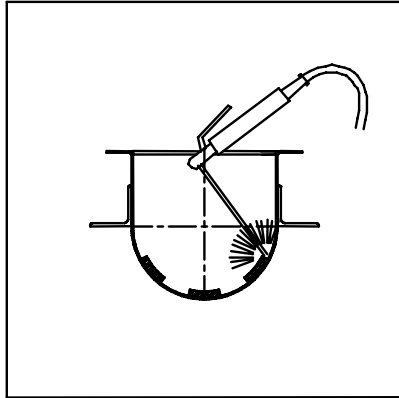


Figure 5.2l

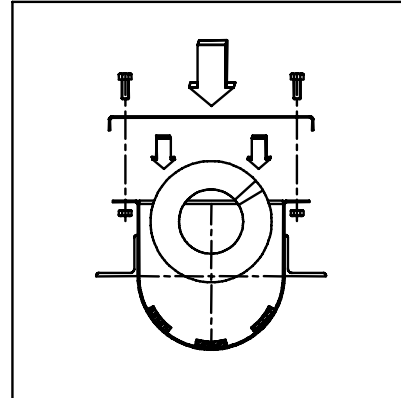


Figure 5.2m

5.3 REPLACING THE SPIRAL

There should be no welded joints in the spiral closer than 4 spiral-turns to the spirals coupling disc.

1. Undo the bolts holding the protective cover and remove it from the trough.
2. Check the new spiral has the dimensions given on the drawing and check against the existing spiral.
3. Un-bolt the spirals coupling disc from the drive shafts coupling disc.

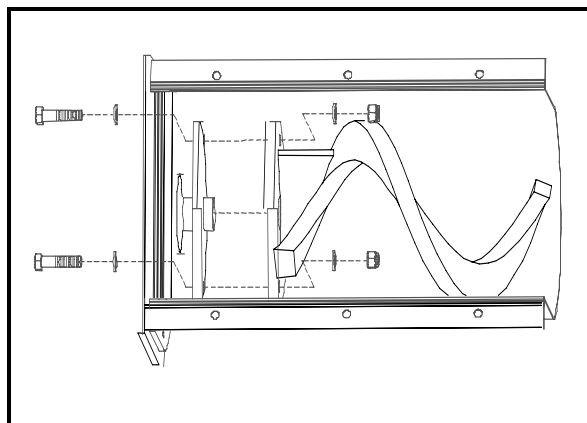


Figure 5.3a - Removing the Spiral

4. Lift the spiral from the trough. Depending on the local facilities the spiral can be removed in several ways. The spiral can be either lifted, pushed out through the troughs opening or cut into sections etc.
5. Place the new spiral in the trough.
6. Fasten the coupling discs together (use new locking nuts each time).
7. Replace the protective cover to the trough.

5.4 REPLACING THE DRIVE SHAFT

1. Undo the bolts holding the protective cover and remove it from the trough.
2. Un-bolt the spirals coupling disc from the drive shafts coupling disc.
3. Remove the spiral from the trough or move it forward enough so that the drive shaft can be removed via the trough.
4. Unscrew the locking bolt, spring washer and stepped spacer from the drive shaft, located at the rear of the gearbox (see fig. 5.4a).
5. Remove the gland cover screws from the packing box (see Fig 5.4b).

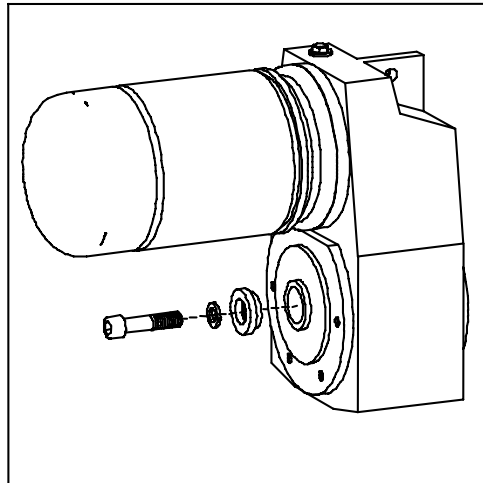


Figure 5.4a - Remove the Locking Bolt, Spring Washer and Stepped Spacer

6. Use an extractor tool to push the drive shaft into the trough. Remove the key from the gearbox keyway before the drive shaft goes through the packing box.

NOTE - The end of the drive shaft must be protected so that the threads are not damaged. A screw can be threaded into the end of the shaft before this is placed under pressure.

7. Remove the old drive shaft from the trough and lift in the new one.

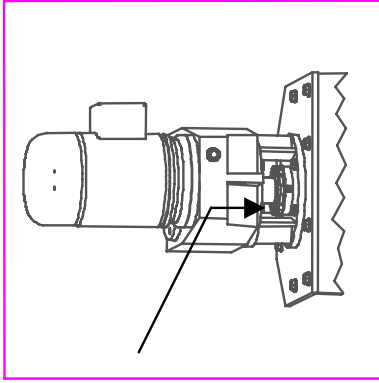


Figure 5.4b - Gland Cover Screws

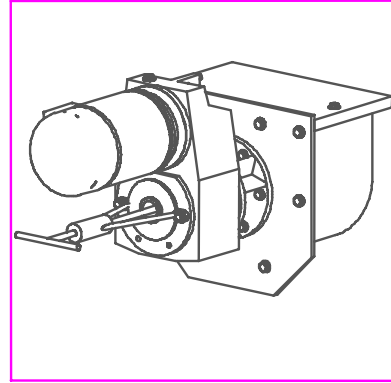


Figure 5.4c - Using an Extractor Tool

8. Turn the gearbox hollow shaft so that the key way is in the correct position in relation to the spirals drive shaft. Push the new drive shaft in so that it takes the place of the old shaft. Place the key in the key way before the drive shaft goes into the gearboxes hollow shaft.
9. Screw the locking bolt, spring washer and stepped spacer into the new drive shaft.

NOTE - The spiral must be pushed towards the drive end in order for the locking bolt to thread into the drive shaft.

10. Tighten the gland cover screws so that only a 7mm (approx.) gap remains between the packing box seat and the gland. Tighten the screws alternately and check the remaining gap after each turn.
11. Fasten the coupling discs together (use locking nuts).
12. Replace the protective cover to the trough.
13. Lubricate packing box as per Appendix 'Lubrication Check Sheets'.
14. Test run conveyor with material to make sure that the packing box does not leak. If there is heavy leakage tighten the gland cover screws.

NOTE - DO NOT OVERTIGHTEN.

5.5 REPLACING THE SPIRAL BRUSH

This procedure involves welding. See *Section 2.7 "Welding instructions"* before commencing to weld.

1. Remove the spiral as described in *Section 5.3*.
2. Grind away the welds holding the spiral brush.
3. Remove the spiral brush.
4. Form the new spiral brush around the spiral. The new brush should stick out from the spiral by about 5 mm.

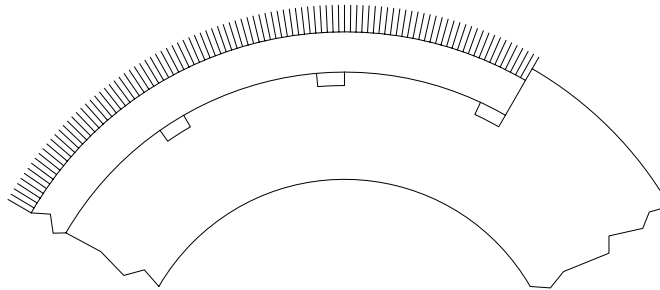


Figure 5.5a. Mounting the spiral brush.

5. Weld the new spiral brush to the same side as the previous brush.
6. Replace the spiral to the trough as described in *Section 5.3*.

6.0 TROUBLESHOOTING

6.1 GENERAL

Between regular maintenance inspections, be alert for signs of motor or Conveyor trouble. Common symptoms are listed below.

Correct any trouble immediately and AVOID COSTLY REPAIR AND SHUTDOWN.

Troubleshooting shall be done with the power supply disconnected and locked off, except for those checks which cannot be performed without voltage.

Always make sure there is no one near the conveyor when the power supply is turned on. Use the following table as an aid to troubleshooting. It is assumed the conveyor and installation have formerly functioned satisfactorily.

6.2 TROUBLESHOOTING CHART

PROBLEM	CAUSE	REMEDY
Conveyor Fails to Start	Blown Fuse	Determine and correct cause of failure and replace fuse
	Motor protection device activated	Reset protective device. Identify and correct cause for failure
	Motor protection device faulty or will not reset	Check protection device for faults
	Motor not connected for proper voltage	Check connection diagram in conduit box cover and correct the wiring.
Conveyor starts but motor protection device trips immediately	Spiral jam from foreign object entering trough.	Remove object and restart
	Gearbox seizure due to no oil	Remove gearbox and service
	Settings on motor protection incorrect	Check and re-set
	Motor improperly connected	Check connection diagram in conduit box cover and correct the wiring
Excessive vibration	Loose drive station	Check and re-tighten fixing bolts
	Unstable ground conditions	Rectify
	Loose support/trough connections	Check and re-tighten
Conveyor output is too low	Worn spiral screw	Replace spiral
	Material being conveyed is not as originally specified	Contact SPIRAC

TROUBLESHOOTING CHART cont.

PROBLEM	CAUSE	REMEDY
Motor overheats	Motor not connected for proper supply voltage	Check connection diagram on conduit box cover and correct wiring
	Insufficient cooling air volume due to obstructed air flow	Provide clearance around fan area
	Motor allowable duty cycle is exceeded. Too many starts per hour	The problem may not be solved by a larger unit. Review with manufacturer
	Single phasing due to break or loose connection in supply line or blown fuse	Repair supply line. Replace fuse
Spiral screw jamming	Excess material causing spiral to rise and interfering with lids/cross bars	Reduce material inflow. Install anti-lift bars
	Foreign object in conveyor	Remove object
	Liner has come loose and wedged itself inside the spiral	Remove and replace liner
	Incorrect alignment of screw when welding causing eccentric rotation	Confirm and replace/re-weld
Conveyor runs in wrong direction	Electrical cable leads wired incorrectly	Reconnect two phase wires.

7.0 SAFETY

7.1 GENERAL

The following instructions should always be observed when handling or working with the conveyor –

1. SPIRAC equipment is supplied conforming to AS 4024.1 - 1996 - Safeguarding of Machinery and complies providing all guards remain locked in place with the bolts supplied. Any work that necessitates removal of any guarding must be carried out in strict accordance with the SPIRAC Operation and Maintenance manual supplied. However Local work practices and regulations should be applied to the selection of any protective equipment or labeling that may be required.
2. Ensure the conveyor is maintained in accordance with section 4. MAINTENANCE of this manual.
3. Any person who will install, operate, service, repair or supervise the operation of this equipment must be trained and informed in accordance with local regulations and legislation.
4. Where local regulations dictate that Work method statements, Safe working practice statements, Job Safety Analysis, Pre-commencement Hazard checks and attendance to tool box meeting be adhered to, it is the responsibility of the owner/operator of this equipment to ensure the forenoted is actioned and recorded.
5. Always isolate the conveyor main power source and ensure that the conveyor cannot be started before commencing any servicing work.
6. Ensure that all service equipment, such as but not restricted to, chain blocks, slings, staging is well maintained and is in accordance with local regulation and legislation.
7. Never try to lift more than one item at a time i.e. protective covers (or lids).
8. Take care to avoid compression injuries when removing or replacing the spiral. Note that the spiral can slide out of the trough when the conveyor is inclined.
9. Personnel operating or servicing the conveyor should be equipped with the correct protective wear should a biological or mechanical hazard be present. Local work practices and regulations should be applied to the selection of the protective equipment.
10. Personnel working frequently in these areas where conveyors have remote control or automatic start/stop, must be informed of the operation.
11. On completion of any service work, please refer to this manuals section 3. OPERATION, for the necessary instruction on re-starting.
12. Ensure that no one is working on the conveyor before it is started.
13. Never use the conveyor for other purposes other than which it is designed or above its given capacity.
14. Personnel should never use the conveyor as a walkway to go to other areas.

7.2 NOISE

The equivalent continual A-wave noise level during normal operation is <70dB.

In cases where the equivalent continual A-wave noise level exceeds 70 dB, ear protection must be worn.

8.0 SPARE PARTS

8.1 CONVEYOR PARTS DESCRIPTION

The list of spare parts gives the correct names for the parts of the conveyor and therefore eases the ordering of spare parts.

The dimensions and technical data for your conveyor are specified in Appendix 'General Arrangement Drawings'. Make sure you have the drawing available when ordering parts by telephone. Also refer to Technical Specifications in Appendix 'Conveyor Data Sheets'.

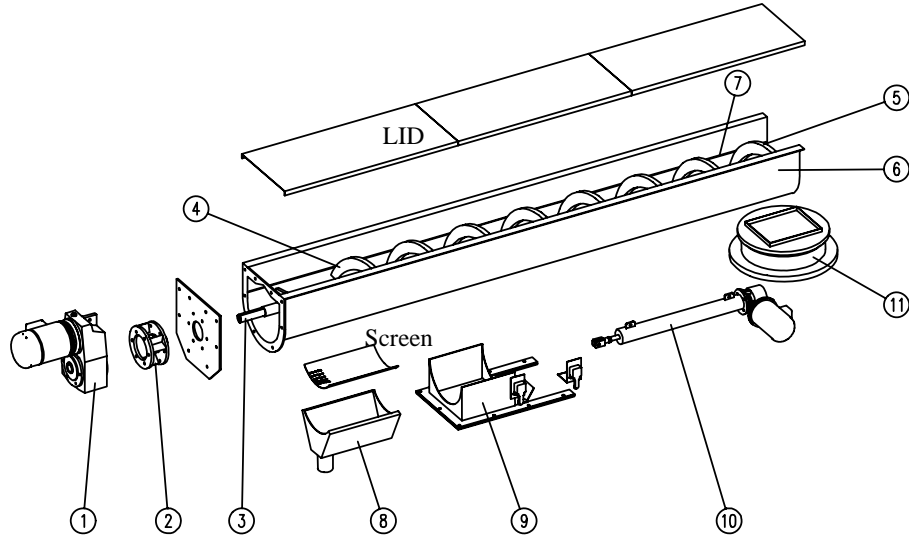


Figure 8-1. Conveyor Parts

Conveyor Standard Parts		Accessories	
1	Motor and gearbox	8	Draining section with screen
2	Bell Housing	9	Slidegate (Knifetype)
3	Drive shaft and coupling disc	10	Electronic linear actuator / pneumatic cylinder
4	Spiral and coupling disc	11	Longopac holder with adapter
5	Spiral		
6	Trough		
7	Liner		

Recommended Spare Parts

SPIRAC have endeavoured to provide you with equipment that will give you continued and long lasting service. However, we recommend that the following wear items be kept as a minimum to ensure uninterrupted service:


Drive Station	Gland Packing	1 Set (for each size gearbox supplied)
Conveyor	Liners – Duraflo (with coloured wear backing) or Steel	Depends on conveyor length and type of liner originally supplied - Refer to Drawing
Instrumentation (Where applicable)	Motion Sensing Probe	1 required (for each area)

For actual part numbers and descriptions, please refer to Technical Specifications in Appendix 'Conveyor Data Sheets' and the Appendix 'General Arrangement Drawings', also quoting the drawing number.

8.2 SUPPLIER CONTACT

SPIRAC ENGINEERING has Sales Offices throughout the world. Manufacturing is undertaken in Australia and Sweden. If you are unsure of your Agent, please make your initial contact to –

Or-

	Document Number :	Error! Reference source not found.--CDS-01	
	Project :	Error! Reference source not found.	
	SPIRAC Client :	Error! Reference source not found.	
	Conveyor Type :	U___-SPX/SS	
	SPIRAC Conveyor Tag :	Error! Reference source not found.-	
	Drawing No :	Error! Reference source not found.-__	Rev :

CONVEYOR DATA SHEET

<i>Application Details</i>	
Material to Convey	Dewatered sludge
Capacity (m3/hr)	
Density (kg/m3)	

<i>Spiral Details</i>	
Spiral Designation:	AB280/330-60x25+40x15
Direction of wind	Right hand wound
Pushing / Pulling	Pushing
Material	HTMAS

<i>Construction Details</i>	
Trough / Lid Material	
Liner(Material/Thkness)	SPX / ___mm
Packing Gland	Burafion 5846 / 6.35
Dry Conveyor weight (kg)	

<i>Optional</i>	
Local Control Panel	N/A
Slidegates	N/A
Washdown Nozzles	N/A
Load Monitor	N/A
Motion Sensor	N/A

<i>Motor Details</i>	
Manufacturer	SEW
Frame Size / Poles	
Rated Power (kW)	
Rated Current (A)	
Motor Speed (rpm)	
Voltage / Hertz / Phase	415 / 50 / 3
IP Rating	
Finish	Standard

<i>Gearbox Details</i>	
Manufacturer	SEW
Model	
Ratio (i)	
Output Speed (rpm)	
Mounting Position	
Oil Capacity (litres)	
Anti-Condensation ter (230V)	N/A
Oil Level Sight Gauge	N/A
Torque Limiter	N/A
Finish	Standard
Drive Serial No.	

LUBRICANT CHECK SHEET

Part to be lubricated	Gearbox
Recommended lubricant	BP Energol GR-XP 220 (or equiv)
Change Frequency	6 - 12 months
Oil Volume	Refer Conveyor Specification Sheet
Part to be lubricated	Bell Housing Gland Packing – Buraflon 5846 / 6.35
Recommendable lubricant	Castrol Grease EPL2 Multi Purpose Extreme Pressure
Change Frequency	Every 6 months
Filling method	Grease Gun

Gearbox Mounting Positions and Relevant Lubrication Points

