FREDERICK CROWTHER AND SON LTD

CROMAR

EST 1962

Swarf Management and Coolant Filtration Systems

Operation & Maintenance Manual

Frederick Crowther & Son Ltd.
Locksley Works, Armytage Road Industrial Estate, Brighouse, West Yorkshire HD6 1QF

Tel. +44 (0) 1484 400200 Fax. +44 (0) 1484 728088

Email: sales@cromar.co.uk www.cromar.co.uk

Health and Safety

This manual contains instructions intended for the user's daily work with the equipment.

This manual must always be available to the individual or individuals working with the equipment.

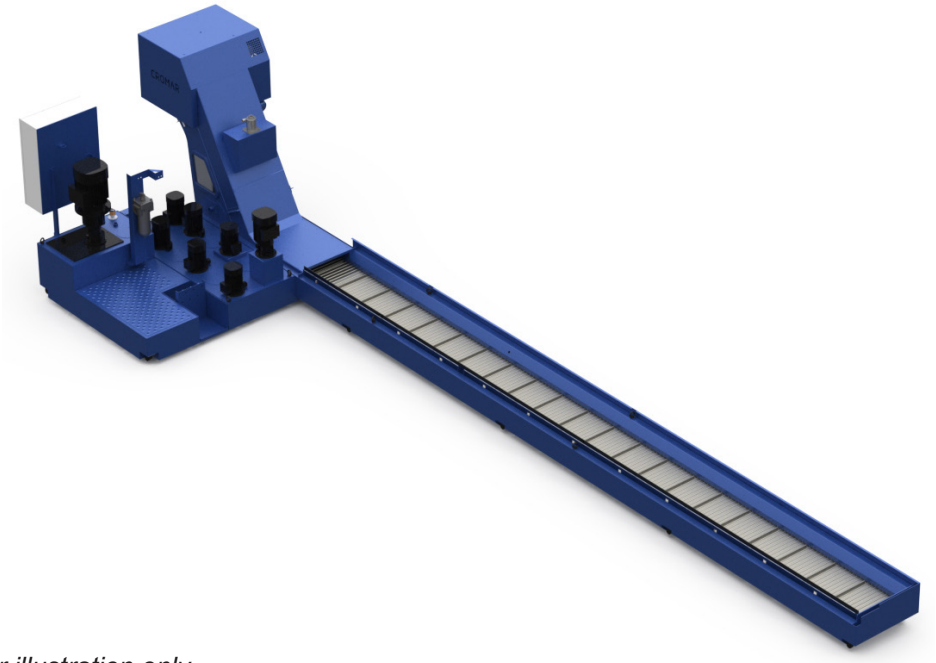
It is important to ensure that:

- The manual and other applicable documents are retained for the entire service life of the equipment
- The manual and other applicable documents are included as part of the equipment
- This manual is passed on to other users of the equipment
- This manual is updated if any supplements or amendments to the equipment take place
- This manual describes the methods applied when using the equipment.

Safety code

- Before you start using the equipment and carrying out maintenance or servicing on this equipment, please read through the applicable parts of the instruction
- Assume all electrical equipment is live
- Assume all hoses and pipelines are pressurised
- When servicing and maintaining the equipment/machine, ensure that the electrical supply is disconnected and the pressure in pipes and hoses is released in a controlled manner
- Servicing and maintenance must be carried out by authorised service and maintenance staff only
- Use only spare parts approved by Frederick Crowther & Son Ltd
- Make sure that the machine is securely mounted and installed in accordance with instructions before starting it
- Use the machine only for the intended use
- In the event of abnormal vibration or noise – stop the machine and consult the manual
- Electrical installation must be carried out by an authorised electrician only
- Tanks must be drained of cutting fluids before any lifting operations are carried out.

4. Series III Conveyor



For illustration only.

4.1 Transportation

General

Swarf Management Systems should only be moved by trained personnel, competent in crane operation and slinging.

Do not stand under the moving unit! The illustrations on this page are to be seen as examples. Always use the equipment included for lifting and transport.

4.1.1 With Fork Lift Truck

Transport only on the original wooden pallet supplied. Ensure equipment is secured against falling or slipping.

4.1.2 With Crane

Lift using existing lifting points as indicated.
Note :- The net weight is displayed on the name plate located on the conveyor hood.

Where applicable, conveyors are fitted with castors to assist with final positioning.

4.2 Installation

Potential Hazards

4.2.1

Conveyor Discharge Area . This area is designated a danger zone **on no account should hands be placed into the discharge aperture.** Should it be necessary to access this area, ensure the conveyor is stopped, electrically isolated by a switch adjacent to the motor, or by disconnecting at the plug and ensure it cannot be accidentally re-started. **Only qualified personnel should access this electrical equipment.**

4.2.2

Standing on the conveyor belt is not Recommended. For emergency access it is possible to stand on the conveyor, provided the conveyor is stopped, electrically isolated and cannot be accidentally re-started.

4.2.3

Do not allow – bar ends, components, tooling equipment or hand tools to fall into the conveyor. These could cause serious damage to the conveyor belt and casing. If one of the above does fall into the conveyor casing – stop the conveyor and machine, and remove immediately.

4.2.4 Swarf Discharge

Do not operate without a collecting container in position to receive swarf. Do not allow container to overfill so that swarf can be carried back into the conveyor. Where end user conditions are such that hot swarf can be discharged from the conveyor, the operator should be made aware of this hazard.

4.2.5 Return end

For maintenance purposes it is possible to run the conveyor in reverse. In this mode it is a dangerous condition between the conveyor belt and the casing aperture.

4.2.6 Controls

Incorporated in Parent Machine Controls

The conveyor should always be running, during all cutting operations. If automatically stopped by interlocks etc. for safety reasons the conveyor must be restarted when cutting recommences. It is essential that the conveyor motor can be isolated either using a multi-pin plug and socket or an isolator in the motor supply cable.

4.2.7 Control of the Conveyor

Select ‘Forward’ 1, on both switches to run the conveyors in the ‘Operational Mode’.

It is recommended that the conveyors be continuously run throughout a shift period and be allowed to clear all swarf before stopping.

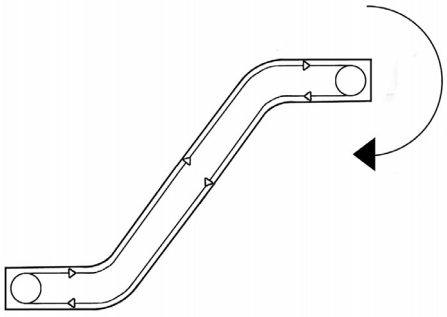
To stop conveyors select’ 0’ on both switches.

To reverse the direction of the conveyors, use the Hold to Run, Jog Reverse Control 2, to run the conveyors in the opposite direction. This mode should only be used in the event of jamming or for maintenance purposes.

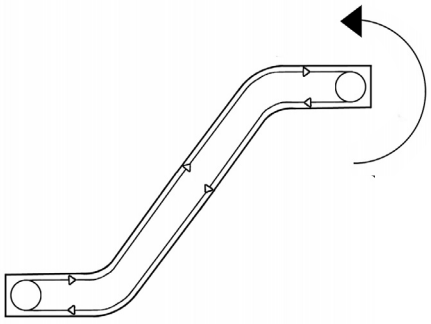
To re-set the conveyors after an emergency stop. Unlatch the ‘Emergency Stop Button’.

4.2.8 Direction of Operational Mode

Slat Conveyor



Scraper Conveyor



4.2.9 Operation – Swarf Applications

Type of swarf – It is recommended that wherever possible swarf be produced in chip form. Bushy or curly swarf is to be avoided as it is difficult to convey and causes blockages in the conveyor. Chip breakers in the tooling or a ‘pecking’ motion in the CNC programme can be employed to prevent this occurring in most applications.

Swarf Handling Capabilities
Slat Conveyor

Material	Steel				Cast Iron		Aluminium		Brass	
Conveyor Type	S	M	L	Bushy	Small	Medium	Small	Medium	Small	Medium
Scraper	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓

Small chips up to 5mm. Medium chips up to 15mm. Large chips above 15mm.

Scraper Conveyor

Material	Steel				Cast Iron		Aluminium		Brass	
Conveyor Type	S	M	L	Bushy	Small	Medium	Small	Medium	Small	Medium
Scraper	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓

Small chips up to 5mm. Medium chips up to 15mm. Large chips above 15mm.

4.2.10 Conveyors located in coolant tanks do not have a sealed casing but contain drain slots, generally located in case sides, to allow separation of coolant from swarf and re-circulation into the storage tank.

4.2.11 Conveyors used as an integral coolant tank have a leak proof casing to contain the coolant. A drain boss is incorporated to facilitate empting.

4.2.12 Where coolant pumps are fitted, these are protected by a mesh filter screens or baskets to minimize ingress of solids into the pump impeller.

4.2.13 Any coolant medium is the sole responsibility of the end user and not the conveyor supplier, and all references should be made to the coolant supplier's safety sheets.

4.3 Mechanical

The conveyor should be manoeuvred into the operating position and fastened to the machine body when appropriate. The screws or castors located at the base of the legs, should be adjusted to support the conveyor, in the operating position.

Where loose swarf chutes are supplied, these should be fitted within the machine to maximize swarf collection onto the conveyor belt.

4.4 Electrical

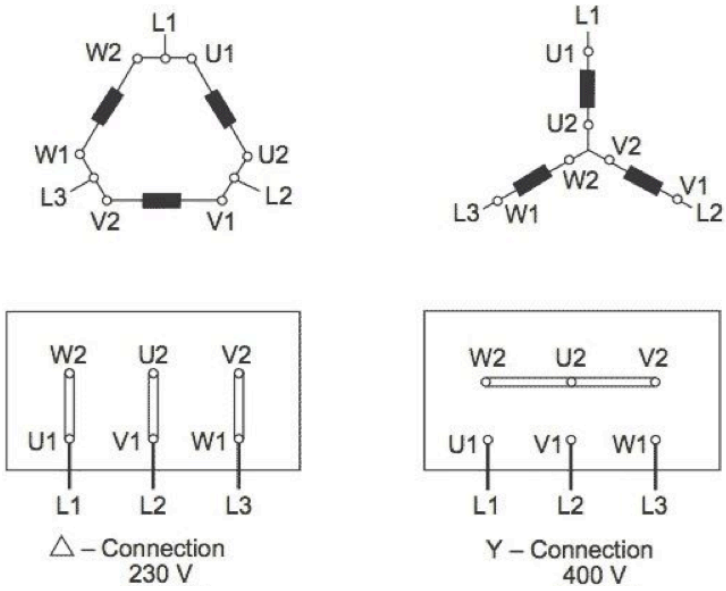
Conveyors Supplied With Controls

Where controls are fitted, these are normally found mounted on the incline section of the conveyor case and consist of a '3 Position Rotar Selector Switch', incorporating 'Centre off', 'Forward' Run & 'Jog Reverse', functions and also a separate 'Emergency Stop Locking Button'.

Note: Rear exit conveyors only are additionally fitted with start warning buzzer and delayed start-up of conveyor.

The motor is also pre-wired to the control box, in accordance with Fig. 2 and a 4 core flying lead (3 phase and earth), of appropriate length, is attached to the control box for connecting to the machine supply. A plug is fitted to suit specific requirements. Additional wiring may be incorporated to comply with specific requirements. IN ALL INSTANCES refer to the wiring diagram and ensure the conveyor supplied is compatible with the electrical supply required.

Figure 2.



Conveyors Supplied With Control Panels

Where a control panel has been fitted the system should be incorporated in to the parent machine as detailed in the wiring diagram supplied.

Conveyors Supplied Without Controls

The conveyor drive motor should be wired from the appropriate parent machine controls, using 4 core wire of a size compatible with the current rating. The 3 phase is connected to terminal U1, V1, and W1 in the motor terminal box in the alternative configurations as indicated above in Fig. 2 and the earth to the earth terminal. The machine controls should include the following basic functions : Forward ‘start’ and ‘stop’ controls. ‘Hold’ to run ‘Reverse’ control and complete with contractors and overloads, of compatible current rating.

Interlocking with the machine access door stops the conveyor when the door is opened. All wiring should conform to the latest harmonized European standards or IEE regulations.

4.5 Maintenance

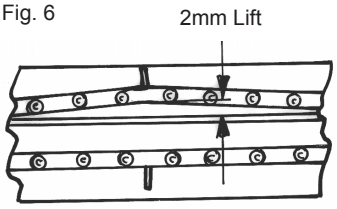
Nameplate incorporating model number, order, serial number, part number, dispatch date and unit weight is attached to the conveyor casing

4.5.1 The conveyor belt tension and chain drive tension, are all factory set and should be checked after approximately 500 hours running, and if necessary, re- set in accordance with Section 4.5.2.

4.5.2 Conveyor Belt

The conveyor belts are correctly tensioned prior to dispatch. After running for approximately 200 hours, recheck the tension. The belt tension is adjusted using the studs attached to the take up bearings, usually located at the drive end. Ensure each side of the belt is adjusted evenly. Correct tension is indicated by 2mm of lift of the belt in the open horizontal section (as per fig. 6)

Fig. 6



4.5.3 Any loose or adjustable chutes, within the swarf collecting area, should be fitted and set to close gaps, with the adjacent machine walls and then secured in position.

4.5.4 Ensure overload in machine electrical cabinet is rated and set to suit full load current of the conveyor motor.

4.5.5 Regular maintenance is essential for proper filter performance. Inspect the filter screen weekly.

Look through the sight window.
The filter screen should be free of chips and should appear clean.
A dark stripe around the drum suggests one or more backwash nozzles are blocked or not properly aligned.

If there is any damage to the filter screen it must be replaced immediately.

4.5.6 Replacing the Filter Screen

IMPORTANT

Turn off power and remove the drive unit before attempting the following procedure. The drum can then be turned by hand when replacing the filter screen.

CAUTION

The filter screen can be damaged if improperly handled. Sharp objects can cut or pierce the material.

Rotate the drum until the straight clamping strip is at the top. The straight clamping strip runs the entire width of the drum.

IMPORTANT

Mark the straight and curved clamps so they can be returned to their original positions on the drum.

Remove the nuts and straight clamping strip and the first set of curved clamps closest to the incline end of the conveyor. Remove the old screen at the same time.

Carefully rotate the drum by hand so the next set of curved clamps can be removed. Continue this process until all the curved clamps and the old screen have been removed.

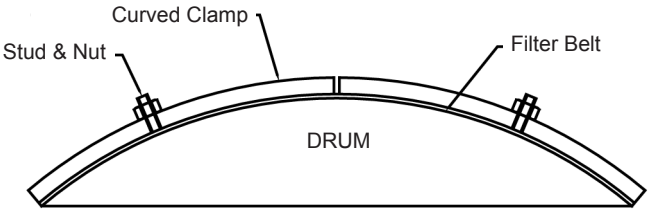
Align the holes of the new screen over the studs. Be sure to start at the straight clamping strip. DO NOT tighten the nuts holding the straight clamping strip.

Continue the above process until the new screen is completely installed.

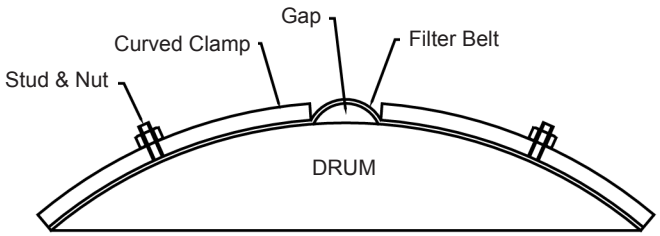
Overlap the ends of the screen, replace the straight clamping strip and tighten the nuts.

NOTE

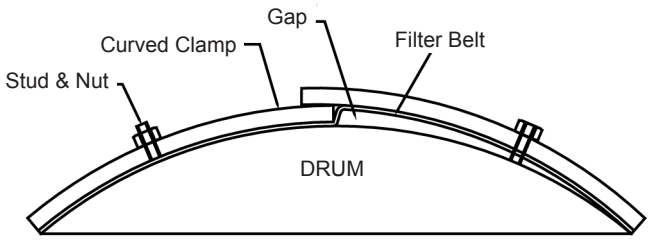
When tightening nuts on the curved clamps, be sure to avoid puckering the screen material at the intersection of the curved clamps. This can allow large chips to migrate into the inside of the drum adversely affecting the cleaning efficiency of the filter unit.



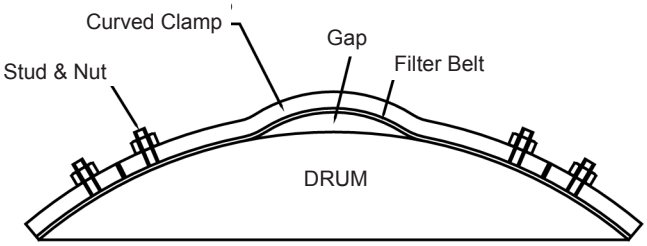
Correct Assembly



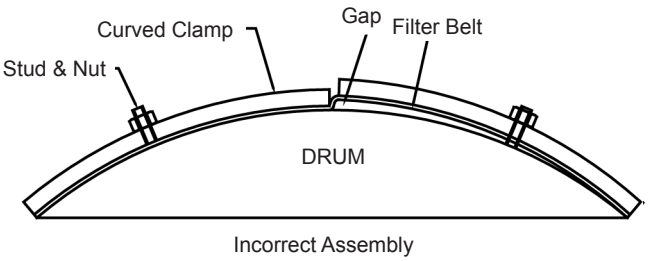
Incorrect Assembly



Incorrect Assembly

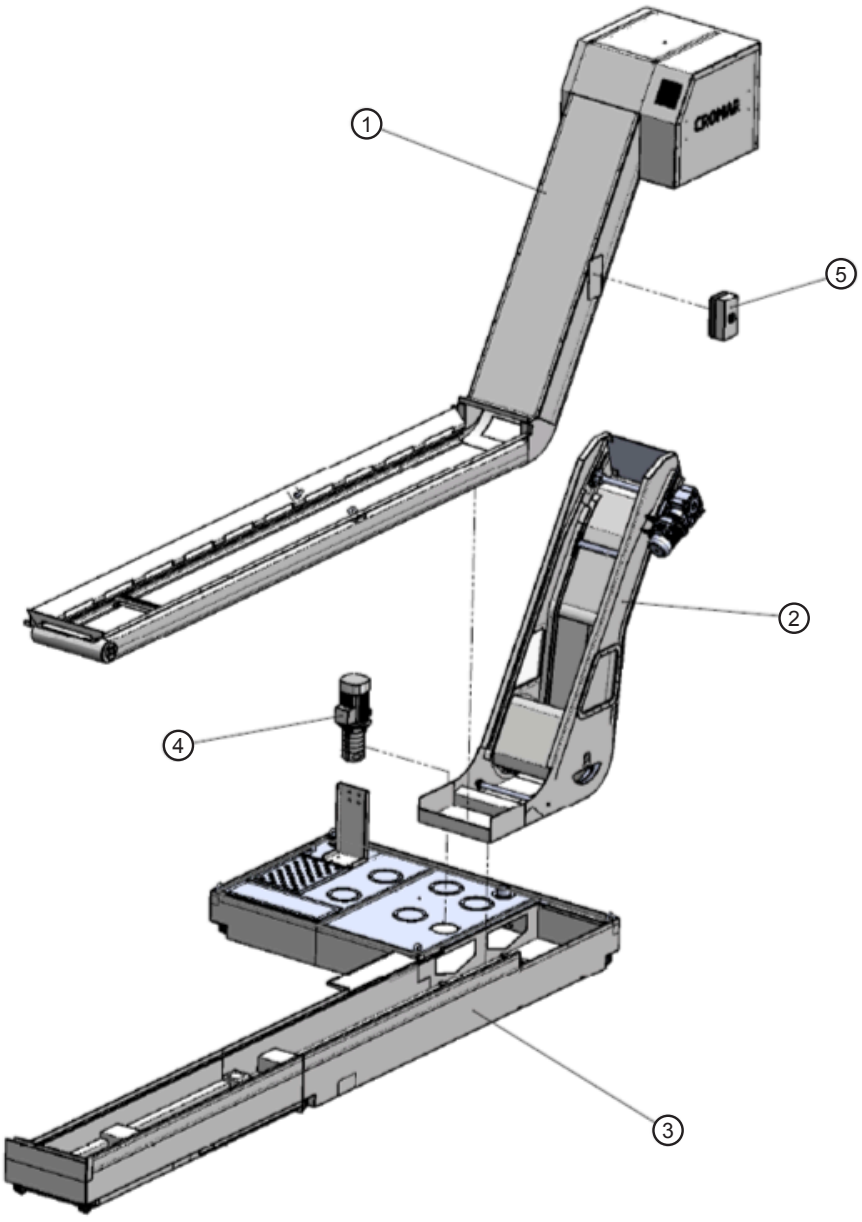


Incorrect Assembly



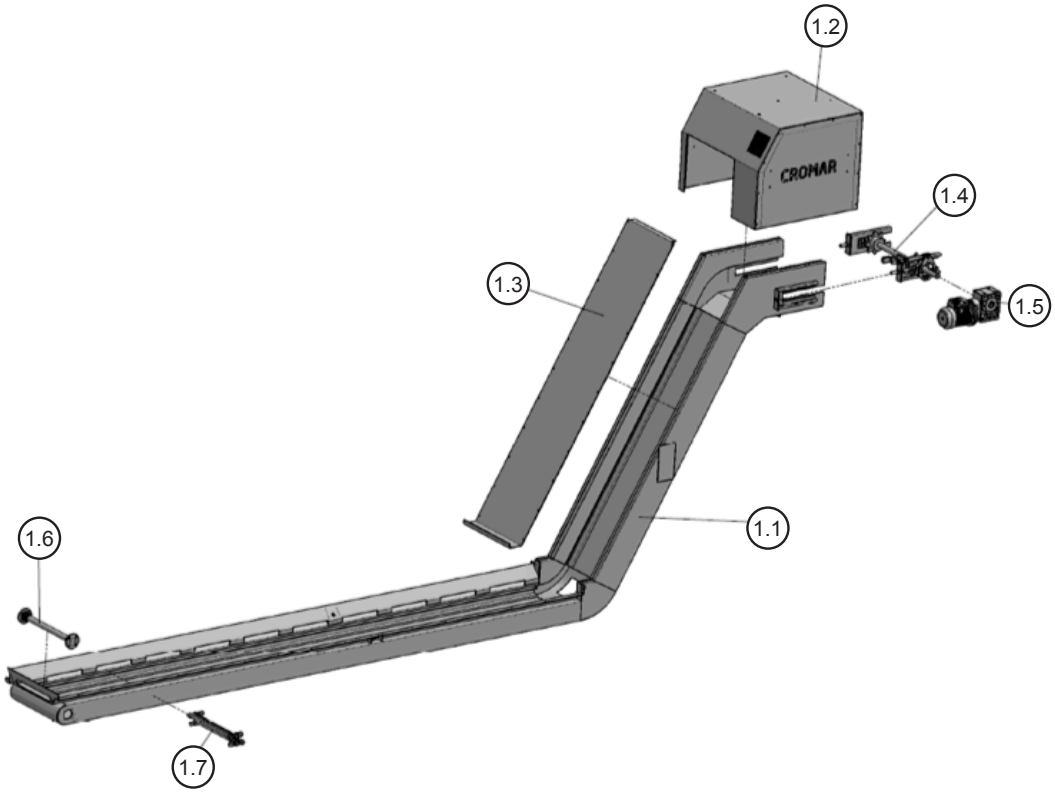
Incorrect Assembly

Series 3 Conveyor System



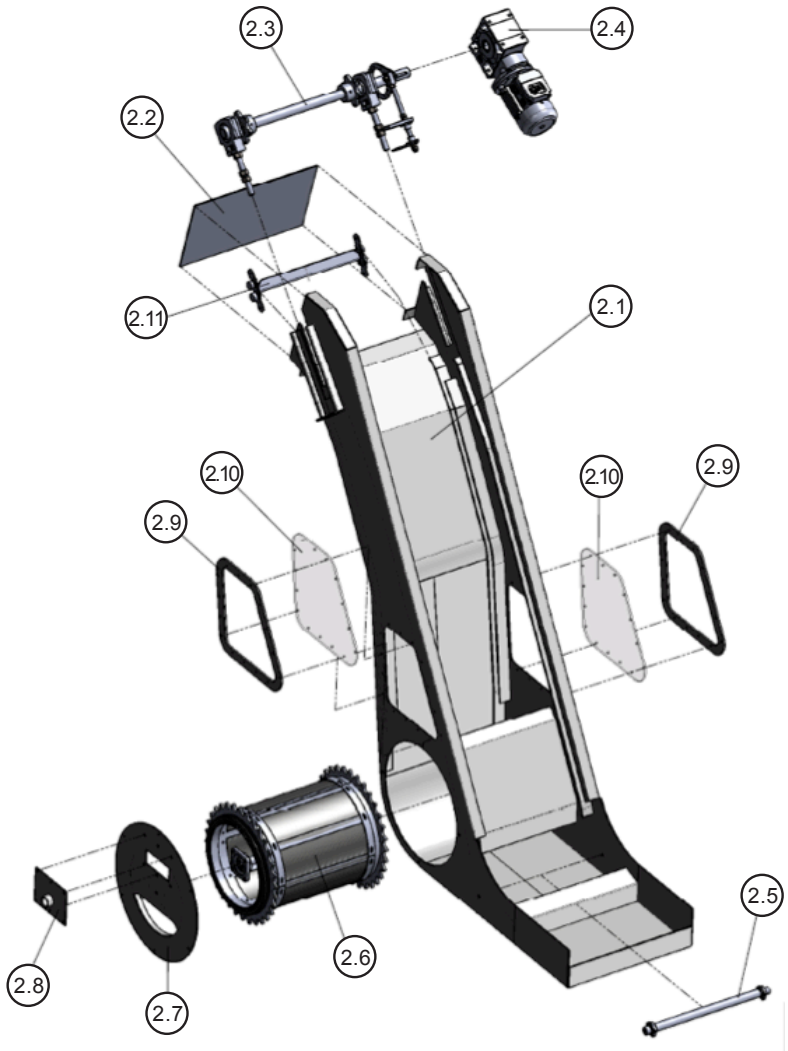
Item Number	Description
1	Slat Conveyor
2	Rotary Drum Conveyor
3	Tank
4	Pump
5	Electrical Controls

Series 3 Slat Conveyor



Item Number	Description
1.1	Conveyor Body
1.2	Top Cover
1.3	Incline Cover
1.4	Drive Assembly
1.5	Motor Gearbox
1.6	Return End Assembly
1.7	Belt Assembly

Series 3 Scraper Conveyor Assembly



Item Number	Description
2.1	Conveyor Body
2.2	Drive End Cross Plate
2. 3	Drive Assembly
2. 4	Motor Gearbox
2. 5	Return End Assembly
2.6	Rotary Drum Assembly
2.7	Drum Assembly
2.8	Backwash Pipe Plate
2.9	Inspection Window Brace Plate
2.10	Polycarbonate Inspection Window
2.11	Belt Assembly

4.6 Trouble Shooting

WARNING!

Conveyor to be shut down and electrically isolated prior to any corrective actions.

Electrical maintenance and repairs to be carried out by suitably qualified electrical personnel only.

Problem	Symptoms	Action
4.6.1 Conveyor does not start.	Loose wire. Overload trip. Conveyor jammed. Isolator switch to “off”.	Check all wiring contacts. Reset overload. Clear congestion. Turn switch to “ON” position.
4.6.2 Conveyor motor starts, belt does not run.	Convey or jammed.	Clear congestion.
4.6.3 Conveyor intermittently jams or slips.	Belt overload - excessive swaft buildup, or solid foreign body between belt and case.	Clear congestion area.
4.6.4 Motor overheats.	Conveyor jammed or overloaded. Overload setting. Motor with phase out.	Clear congestion area. (Reversing the conveyor may clear jamming). Check setting of overload to suit motor current rating. Check wiring for loose connection.
4.6.5 Coolant pump operating but with low pressure and/or low flow.	Pump running in wrong direction. Pump blocked or impeller worn. Incorrect voltage or frequency. Insufficient coolant in main tank.	Change leads. Clean pump and repair as necessary. Check supply and change as necessary. Add coolant.

Problem	Symptoms	Action
4.6.6 Excessive contamination in clear coolant tank.	Screen damaged. Coolant foaming excessively. Coolant viscosity higher than originally specified. Coolant flow rate higher than originally specified.	Replace as necessary. Consult coolant supplier Change to correct coolant or change screen type. Reduce flow rate to match capacity of rotary filter system.
4.6.7 Chips and Particles not being cleaned from the filter screen.	Coolant flow to backwash manifold has reduced or stopped completely.	Remove the inline strainer mesh, clean or replace. Check flow control valve has not been closed. Check for backwash pump is operating correctly. Check for blocked backwash spray nozzles, clean and re-place if necessary.
4.6.8 Constant high level coolant.	Coolant flooding.	Clean or replace filter screen.