


# ELPO Pendulum System – Troubleshooting

This section includes general guidelines and troubleshooting suggestions as an aid in isolating and recovering from malfunctions. **ONLY QUALIFIED, AUTHORIZED PERSONNEL SHOULD OPERATE OR MAINTAIN EQUIPMENT.**

Proper troubleshooting is finding the cause of a problem and correcting it in a safe and systematic manner. A change in the system often causes trouble. An understanding of the system, its modes of operation, and how these modes are to work will aid in finding the cause of the trouble.


**WARNING**

- Ensure that all requisite safety precautions are taken while diagnostic procedures are performed.
- Before attempting any maintenance or service operation, make sure that:
  - You do not begin any repair procedure until the proper shutdown procedures and the appropriate power lockout procedures have been applied.
  - The system is de-energized; main electrical switches are open.
- Some maintenance/troubleshooting procedures require the equipment to be running to perform the procedure. In this case only one person should be in command of operating the equipment in maintenance mode only. Constant communication with the person commanding the equipment should be maintained through the procedure.

## Pendulum System Troubleshooting

Problem	Possible Causes	Remedy
<b>Excessive chain wear or chain tension.</b> <i>Note: The chain stretches and wears at the contact point between pin and ring. This wear is normal and it is not a conveyor problem.</i>	Lack of lubrication.	• Lubricate the chain.
	Chain tension too high	• Reduce take-up weight
	Blocked or damaged bearings.	• Inspect bearings and clean if blocked. Replace if damaged.
	Chain obstruction in the run.	• Remove the obstruction, substitute the chain if too much damage.
	Chain Surge	• The conveyor must not be loaded more than the maximum capacity.
<b>Chain too loose</b>	Chain loose and wearing.	• Check the take-up. Add weight if required.
	Take-up jammed	• Clear take-up
<b>Back up or stacking of chain</b>	Too much loose chain.	• Check the take-up. Add weight, if required.
	Blocked or damaged bearings.	• Inspect bearings and clean if blocked. Replace if damaged.
<b>Blocked or damaged bearings</b>	Accumulated or excess lubrication	• Remove from conveyor and clean.

Problem	Possible Causes	Remedy
Bearing pin	Damaged pin or line obstruction	<ul style="list-style-type: none"> <li>Remove the obstruction and substitute the damaged bearing pin with a new pin (don't try to straighten the banded pin).</li> </ul>
Excessive wear, causes hammering of the returns on the vertical curves.	Excessive chain tension.	<ul style="list-style-type: none"> <li>Reduce take-up weight</li> </ul>
Excessive return tension.	Scored bearings pins.	<ul style="list-style-type: none"> <li>Remove the obstruction and substitute the damaged bearing pin with a new pin (don't try to straighten the banded pin).</li> </ul>
Irregular movement of take-up floating frame	Excessive Chain tension.	<ul style="list-style-type: none"> <li>Diminish the tension.</li> </ul>
	Frame sliding bearings worn or blocked with grease and/or debris.	<ul style="list-style-type: none"> <li>Carefully clean or substitute if worn.</li> </ul>
Excessive noise in the gearbox	Needs lubrication	<ul style="list-style-type: none"> <li>Fill the gearbox with oil till the level indicated by the plate or, if needed, lubricate the transmission chain.</li> </ul>
	Oil losses.	<ul style="list-style-type: none"> <li>Lock all closing caps and covers and add lubricant.</li> </ul>
	Worn or broken devices.	<ul style="list-style-type: none"> <li>Disassemble the gear and substitute it.</li> </ul>
The conveyor chain swings or flaps.	Too much loosened chain.	<ul style="list-style-type: none"> <li>Adjust take-up.</li> <li><b>NEVER</b> take away chain links.</li> </ul>
Gearmotor overheating	Excessive conveyor chain tension.	<ul style="list-style-type: none"> <li>Check the run, eliminating the obstructions or blocks on the line.</li> </ul>

## Skid/Body Lock/Unlock Assembly Troubleshooting

Problem	Possible Causes	Remedy
<b>Lock / Unlock device does not engage/disengage</b>	Pneumatic system malfunction	<ul style="list-style-type: none"> <li>• Check if air supply is available and of proper pressure.</li> <li>• Check if valves are operating freely.</li> <li>• Check connections.</li> </ul>
	Sensors malfunctioning	<ul style="list-style-type: none"> <li>• Verify that the sensors are clean, well-positioned, and operational.</li> <li>• Check cables and connections are secure and not damaged.</li> </ul>
	Control system malfunction	<ul style="list-style-type: none"> <li>• Check PLC and relays to ensure that control parameters are proper.</li> <li>• Check cable and connections.</li> </ul>
	Mechanism is loose	<ul style="list-style-type: none"> <li>• Check that the various sub-assemblies are securely mounted.</li> </ul>

## Inlet Table Troubleshooting

Problem	Possible Cause	Remedy
<b>Skid does not move</b>	Gearmotor does not run	<ul style="list-style-type: none"> <li>• Check wiring and plugs.</li> <li>• Gearmotor troubleshooting.</li> <li>• Replace gearmotor.</li> </ul>
	Broken chain	<ul style="list-style-type: none"> <li>• Replace chain.</li> </ul>
	Rollers are soiled with oil	<ul style="list-style-type: none"> <li>• Clean rollers.</li> </ul>
	IDC defective	<ul style="list-style-type: none"> <li>• Replace IDC.</li> </ul>
	Proximity switch defective or loose	<ul style="list-style-type: none"> <li>• Replace or readjust proximity switch.</li> </ul>
<b>Skid speed too high / low</b>	Malfunctioning control	<ul style="list-style-type: none"> <li>• Diagnostic program.</li> </ul>
<b>Wrong Skid stop position</b>	Wrong proximity switch position	<ul style="list-style-type: none"> <li>• Readjust proximity switch.</li> </ul>
<b>Noise with / without vibrations</b>	Loose parts	<ul style="list-style-type: none"> <li>• Check module for loose parts and parts that do not belong.</li> </ul>
	Worn chain	<ul style="list-style-type: none"> <li>• Replace chain.</li> </ul>
	Bearings of Rollers defective or worn	<ul style="list-style-type: none"> <li>• Replace rollers.</li> </ul>

# General Troubleshooting

Device Type	Typical Devices	Action
<b>Re-settable</b>	<ul style="list-style-type: none"> <li>• Light screens</li> <li>• Access Gate Boxes/Safety Plugs</li> <li>• E-stops</li> </ul>	Visually inspect the protection area devices and reset any tripped devices.
<b>Power Distribution</b>	<ul style="list-style-type: none"> <li>• Circuit breakers</li> <li>• Contactors/Relays</li> <li>• Connection</li> </ul>	Check that power is distributed to the control panels, field devices, and components.
<b>Processing</b>	<ul style="list-style-type: none"> <li>• PLC Processor</li> <li>• Input/Output Modules</li> </ul>	Check the Main Control Panel processors and I/O modules for proper operation.
<b>Communication</b>	<ul style="list-style-type: none"> <li>• EtherNet Module</li> <li>• DeviceNet Module</li> </ul>	Check the Main Control Panel EtherNet and DeviceNet Modules for proper operation.
<b>Machinery</b>	<ul style="list-style-type: none"> <li>• VFDs</li> <li>• Motors</li> <li>• Switches/Sensors</li> <li>• Connection System (cables/cords)</li> </ul>	Follow a clear and logic approach to determining a failed device. Eliminate components that are a quick fix.