# High Lift Fork Transfer Troubleshooting

This chapter includes general guidelines and troubleshooting tables 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.

## High Lift Fork Transfer Troubleshooting

| Problem | Possible Causes | Remedy |
|---|---|---|
| **Inoperable operation** | System not in Auto mode | • Put system in Auto mode. |
| | E-stop pushbutton pushed in | • Reset system and resume Auto mode. |
| | Station light screen or gate access violation | • Reset gates and resume Auto mode. |
| | Power circuit breaker tripped | • Investigate and fix the cause of the tripped breaker. Reset breaker and put system in Auto mode. |
| | Defective integrated drive controller | • Check that the IDC disconnect is switched to the ON position.<br>• Check for faulty wiring or loose connection.<br>• Replace defective unit. |
| | Defective gearmotor | • Check for faulty wiring or loose connection.<br>• Replace gearmotor. |
| | Defective lift encoder reader | • Check for faulty wiring or loose connection.<br>• Replace reader. |

| Problem | Possible Causes | Remedy |
|---|---|---|
| | Defective fork unit encoder | • Check for faulty wiring or loose connection.<br>• Replace encoder. |
| | Defective shot pin retracted/extend switch | • Check for faulty wiring or loose connection.<br>• Replace switch. |
| | Shot pin is not retracted | • Reset gated area (close gate and reset area) |
| | Defective shot pin device | • See shot pin troubleshooting table |
| | Chain broken/ stretched | • Replace chain |
| | Communication faults | • Check for faulty wiring or loose connection.<br>• Check for faulty DeviceNet port block or DeviceNet communication module. |
| **Part is not detected in station** | Dirty lens / reflector<br>Faulty sensor<br>Faulty wiring or loose connection<br>Faulty I/O block<br>Improper sensor settings | • Clean sensor and reflector lens.<br>• Replace sensor.<br>• Replace wiring or tighten connection.<br>• Replace I/O block<br>• Set sensor to light mode and maximum sensitivity level |
| **Part leaning indication** | Body does not set on fork details<br>Dirty lens / reflector<br>Faulty sensor<br>Faulty wiring or loose connection<br>Faulty I/O block<br>Improper sensor settings | • Clean sensor and reflector lens.<br>• Replace sensor.<br>• Replace wiring or tighten connection.<br>• Replace I/O block<br>• Set sensor to light mode and maximum sensitivity level |
| **Chain break indication** | Chain broken<br>Defective chain break limit switch<br>Carriage out of alignment<br>Fault I/O block or wiring | • Replace chain<br>• Replace switch<br>• Level carriage<br>• Replace device or cable – tighten if loose |
| **Overtravel Indication** | Faulty encoder / wiring<br>Faulty photocell sensor<br>Dirty sensor lens / reflective tape<br>Faulty sensor cable / I/O block<br>Improper sensor settings | • Replace encoder / cable<br>• Replace sensor<br>• Clean sensor lens and reflective tape<br>• Replace cable / I/O block.<br>• Correct sensor settings |

| Problem | Possible Causes | Remedy |
|---|---|---|
| **Forks not at home indication** | Defective cardan shaft<br>Faulty encoder / wiring<br>Faulty proximity switch<br>Faulty cable / I/O block | • Replace shaft<br>• Replace encoder / cable<br>• Replace switch<br>• Replace cable / I/O block |

## *High Lift Fork Transfer Drive Assembly*

| Problem | Possible Causes | Remedy |
|---|---|---|
| **Overload faults** | Defective motor disc brake | • Replace disc brake. |
| | Gearmotor reducer gearing seizing up | • Replace gearmotor. |
| | Increased friction with drive system or with fork gearing | • Perform maintenance procedures.<br>• Check for defective bearings, guide rollers, cams, and mechanical linkages. |
| **Over/Under travel faults** | Faulty integrated drive controller | • Switch to back-up IDC. |
| | Faulty encoder or reader | • Replace encoder or reader.<br>• Check for loose or faulty wiring. |
| | Loose mechanical linkage/connections or worn gearing | • Perform maintenance procedures on drive assembly.<br>• Replace lift chain and idle sprockets. |
| **Inoperable operation** | Defective pneumatic cylinder | • Defective hoses – replace hoses.<br>• Defective cylinder – replace cylinder |
| | Defective pneumatic control board | • Defective hoses or pneumatic components – replace hoses or components. |
| **Over/Under travel faults** | Defective retract or extend proximity switch | • Check for loose or faulty wiring.<br>• Replace retract or extend proximity switch |

# *High Lift Fork Transfer Lift Carriage Assembly*

| Problem | Possible Causes | Remedy |
|---|---|---|
| **Inoperable operation** | Fork #1 & #2 encoder mismatch | • Broken cardan shaft – replace shaft<br>• Defective encoder / cable – replace encoder / cable |
| **Body does not set on fork details** | Faulty load/unload station stops | • Adjust (conveyor) positioner within specified positioning tolerance (see conveyor manual).<br>• Check station stops for faulty sensors. |
| | Carriage out of alignment | • Adjust carriage for longitudinal alignment. |
| **Overload faults** | Defective motor disc brake | • Replace disc brake. |
| | Gearmotor reducer gearing seizing up | • Replace gearmotor. |
| | Increased friction with drive system or with fork gearing | • Perform maintenance procedures.<br>• Check for defective bearings, guide rollers, cams, and mechanical linkages. |
| **Over/Under travel faults** | Faulty integrated drive controller | • Switch to back-up IDC. |
| | Faulty encoder or reader | • Replace encoder or reader.<br>• Check for loose or faulty wiring. |
| | Loose fork mechanical linkage/connections or worn gearing | • Perform maintenance procedures on fork assembly.<br>• Replace fork. |
| **Noisy Cardan shaft** | Defective universal joint | • Replace Cardan shaft. |

# *High Lift Fork Transfer Chain*

| Problem | Possible Causes | Remedy |
|---|---|---|
| **Excessive noise** | Misalignment of sprocket<br>Loose casings or bearings<br>Too little or too much slack<br>Chain and/or sprocket wear<br>Inadequate lubrication or no lubrication<br>Chain pitch size too large | • Realign sprockets & shafts<br>• Tighten set-bolts<br>• Adjust centers or idler take-up<br>• Replace chain and/or sprocket<br>• Lubricate properly<br>• Check chain drive selection |
| **Chain Vibration** | Resonance to the vibration Cycle of machine to be installed<br>High load fluctuation | • Change vibration cycle of chain or machine<br>• Use torque converter or fluid coupling |
| **Wear on inside of link plate and one side of sprocket teeth** | Misalignment | • Realign sprockets and shafts |
| **Chain climbs sprockets** | Excessive chain wear<br>Excessive chain slack<br>Heavy overload | • Replace chain<br>• Adjust centers or idler take-up<br>• Reduce load or install stronger chain |
| **Broken pins, bushing or rollers** | Chain speed too high for pitch and sprocket size<br>Heavy shock or suddenly applied loads<br>Material build-up in sprocket tooth pockets<br>Inadequate lubrication<br>Chain or sprocket corrosion | • Use shorter pitch chain or install large dia. sprocket<br>• Reduce shock load or install stronger chain<br>• Remove material build-up or install side gashed sprocket<br>• Lubricate properly<br>• Install anti-corrosive chain or sprockets |
| **Chain clings to sprocket** | Center distance too big or high load fluctuation<br>Excessive chain slack<br>Excessive chain wear | • Adjust the center distance or install idler take-up<br>• Same as above<br>• Replace chain |
| **Chain gets stiff** | Misalignment<br>Inadequate lubrication<br>Corrosion<br>Excessive load<br>Material build-up in chain joint<br>Peening of link plate edges | • Realign sprockets and shafts<br>• Lubricate properly<br>• Replace w/anti-corrosive chain<br>• Reduce load or replace w/suitable strength<br>• Shield drive from foreign material<br>• Check for chain interference |
| **Breakage of link plate** | Subjected to shock load | • Reduce shock (e.g. install a shock absorber) |
| | Vibration | • Install a device to absorb vibration(e.g. tensioner idle wheel |

| Problem | Possible Causes | Remedy |
|---|---|---|
| | Moment of load inertia is too big | • Chain section should be checked (increase number of strands or select next larger size chain) |