# Problem Description

ASL130LX MEC joysticks are reporting to have more-than-expected errors when used on the LiNX Wheelchair Electronics. The error code on the LiNX wheelchair electronics is Error Code 1.

A number of ASL130LX MEC Joysticks were returned from Europe to ASL during the past 6 months or so. The number is believed to be 10 returned as of July 18, 2022.

# Definitions and Terms

LiNX Electronics. LiNX electronics is manufactured by Dynamic Controls, Inc. in New Zealand.

Error Code 1. This error code is exhibited when the signals to the wheelchair Control Unit are out-of-an-expected-range.

ASL130LX MEC. This device is designed and mostly assembled by Adaptive Switch Laboratories and has a LiNX bus cable, an interface box and a joystick with a Mode Switch built into the Joystick.  
The ASL130LX features proportional control of Speed and Direction, a switch to send mode change requests to the wheelchair electronics, an integrated Bluetooth module, 2 user switches and Joystick Calibration.

# Problem Analysis

|  | **Why is the Problem Occurring?** | **Answer** | **How was this Verified?** |
| --- | --- | --- | --- |
| Why #1. | Why are the failures happening on wheelchairs with LiNX Electronics ONLY? | Uncertain. | This was verified using Returned Good list. |
| Why #2. | Why is LiNX Electronics exhibiting Error Code 1? | Because the voltage level sent to the LiNX system is outside of the expected range. | This was verified from the Dynamics System Manual. |
| Why #3. | Why is the Full Swing voltage exceeding the Expected LiNX input voltage? | Because the algorithm to transform the Joystick Input signal to the output demand signal did not properly check for Out-of-Range voltage levels. | This was verified using an Oscilloscope and Mutli-meter. |
| Why #4. | Why does Joystick Calibration not fix the problem? | Because the algorithm to linearize the Joystick Input Signal to the equivalent output level did not consider math “Roll Over”. | This was verified using an Oscilloscope and Mutli-meter. |
| Why #5. | Why was this problem not discovered before shipping the product? | Because the Verification Test nor Manufacturing Test include Output Level testing. | Visual inspection of the tests. |