# Skycom CAN-X manual



Issue 2 – 06/12/2023 - Last technical change 07/03/2012

# Contents

Contract Number……………
CAN-X Software Version Number……….……

# Introduction

The manual gives details on the skycom CAN-X lift controller, detailing the hardware that goes to make up the controller along with instructions for the setup of the lift.  The modular system allows variable lift configurations.

Skycom CAN-X consists of a main processor board, with expandable I/O via the addition of I/O and RELAY Nodes.  The controller is fully configurable and all peripherals connected to the processor via the CAN network are also configurable.

The processor has a LCD screen to help in both the setup and fault diagnosis of the lift.  This can be used to modify parameters in order to fine tune the operation of the lift.

The processor connects directly via a CAN network to all ILE peripheral products such as serial indicator, LCD indicator, and speech unit.

**EcoMode**

The Skycom CAN-X controller also incorporates EcoMode offering two reduced power modes:

REDUCED POWER MODE ONE switches off the car lights and fan after an adjustable period of inactivity.

The savings using just Reduced Power Mode One are 1035.3 kW/h per annum.  This equates to a saving indicative of £120 per annum.*

REDUCED POWER MODE TWO switches off indicators, dual illumination and auxiliary equipment after an adjustable period of inactivity. This mode starts once Reduced Power Mode 1 has timed out.

The savings using both Reduced Power Mode One & Two are 4554.893 kW/h per annum. This equates to a saving indicative of £525 per annum.*

*Calculations based on 240 starts per hour between the hours of 5.30am to 7.30pm on a 12 floor lift with position indicators at all landings and 60 watts of car lighting with dual illuminated landing and car pushes.

## The Hardware

All boards have clips that allow them to be mounted on DIN rail.

### CAN-X Processor Module
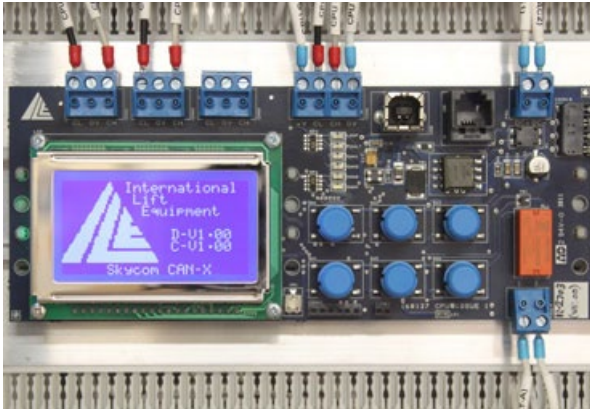


The Skycom CAN-X processor module has the following features:

- USB serial connection to PC
- CAN connection to peripherals
- RTC with external onboard battery
- Automatic discovery of I/O Nodes
- LED Indication (loop, fault, CAN1, 2, 3, Drive Comms)
- Energy efficient isolated switch mode power supply
- Non-active processor hardware components power down
- Serial Drive Communication

The CPU board has a 128x64 pixel resolution LCD screen, with a 6 button keypad interface to enable easy configuration and modification of parameters.  The LCD screen has a backlight timeout.

The 6 buttons are as follows:

**ESC** – to go back one level in the menu system
**UP** – to move up
**ENT** – to select an item in the menu
**LEFT** – to move left
**DN** – to move down
**RIGHT** – to move right

For a full explanation on how to utilise the keypad to parameterise or modify the lift installation please refer to the Menu System section of this manual.

### IO Node

The IO nodes can be 2 or 8 way, both have the following features:

- Isolated internal logic supply with protection
- Isolated CAN interface with protection
- User selectable I/O address and CAN terminating resistor
- On board piezo sounder (call recognition)
- inputs/outputs discrete/linked via software
- Diagnostic and thermal monitoring
- LED indication for CAN

The input stage
- 5-30VDC opto-isolated
- Over voltage and reverse polarity protection
- Current limiting and dissipation

The output stage

- 24VDC (via internal supply)
- 0.7A per channel output current
- Operating voltage upto 36V
- Short circuit and overvoltage protection
- Loss of ground protection
- Under voltage diagnostic and overvoltage shutdown
- Junction over temperature shutdown
- Shorted load protection
- Suitable for inductive loads
- Opto-isolated



2-way IO node
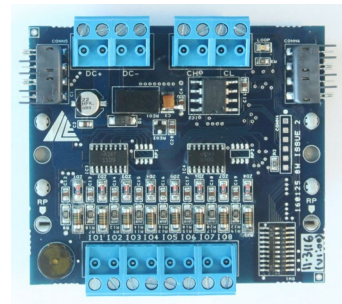


8-way IO node
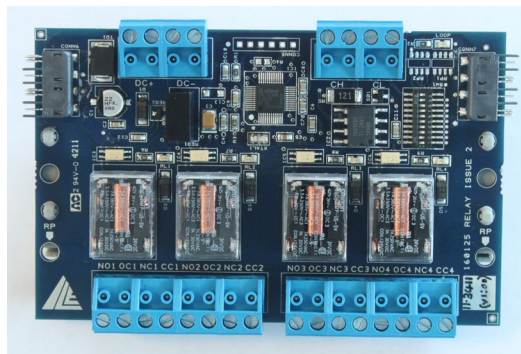


Relay Node

**Relay Node**

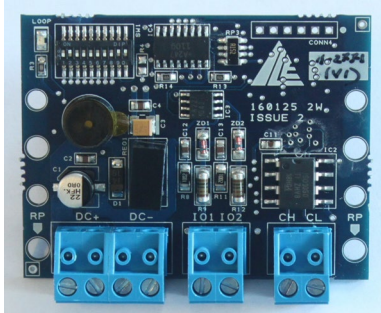The Relay node has the following features:

- Isolated internal logic supply with protection
- Isolated CAN interface with protection
- User selectable I/O address and CAN terminating resistor
- 4 relay outputs (N/O or N/C user selectable via wiring option)
- Double pole independent N/O and N/C contact rated at 8A
- Opto isolated driver
- Status LED indication for each relay

## Node Addressing

The nodes need to be set with the correct node address according to what network they are on. There are 3 networks, LANDING (CAN1) CAR (CAN2) and PANEL (CAN3).

Each board requires the correct binary address to be set relative to its position on the network. The node address can be set by the 10 way switch as shown below (switches shown in the OFF position):

```
ON                            DIP

1   2   3   4   5   6   7   8   9   10
```
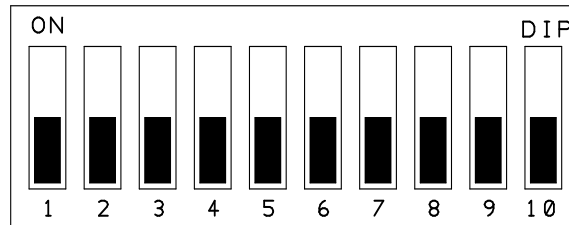
The switches should be set as dictated in the relevant tables below.

Due to the number of addresses needed on the landing network switch 8 is used for addressing if switch 9 is set ON, if switch 9 is OFF then switch 8 is not used for addressing but dictates whether the node is on the CAR or the PANEL network.

Switch 9:        ON - LANDING                    OFF - CAR/PANEL
Switch 8:        ON - CAR                         OFF – PANEL

Switch 10 dictates whether the onboard resistor for the CAN is being used.  Only 1 node per network should have switch 10 in the ON position. This facility means no external resistors are needed for the correct topology of the CAN network.

Switch 10:        ON - 120 ohms resistor inline        OFF - no resistor

In the tables below:

Blank cell - switch in the OFF position.
ON - switch in the ON position.
ON* - check where you need the resistor to dictate the end of the network.

**Panel Nodes**

Switch 1-7: address
Switch 8: should be OFF to signal the PANEL network
Switch 9: should be OFF to signal CAR/PANEL
Switch 10: As above

| Node | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|----|----|----|----|----|----|----|----|----|------|
| 1 | ON | | | | | | | | | |
| 2 | | ON | | | | | | | | |
| 3 | ON | ON | | | | | | | | ON* |
| 4 | | | ON | | | | | | | ON* |
| 5 | ON | | ON | | | | | | | ON* |
| 6 | | ON | ON | | | | | | | ON* |

Panel nodes are addressed with the node closest to the processor as node 1.

**Car Nodes**

Switch 1-7: Address
Switch 8: Should be ON to signal the CAR network
Switch 9: Should be OFF to signal CAR/PANEL
Switch 10: As above

| Node | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|----|----|----|----|----|----|----|----|----|------|
| 1 | ON | | | | | | | ON | | |
| 2 | | ON | | | | | | ON | | |
| 3 | ON | ON | | | | | | ON | | |
| 4 | | | ON | | | | | ON | | ON* |
| 5 | ON | | ON | | | | | ON | | ON* |
| 6 | | ON | ON | | | | | ON | | ON* |

Car Nodes are addressed with the car top box being nodes 1-3, and then the nodes in the Car operating panel nodes 4 onwards. The last node in the car operating panel should have switch 10 set to ON.

## Landing Nodes

Switch 1-8: address
Switch 9: Should be ON to signal the LANDING network
Switch 10: Set to ON for Node 1 (assuming floor 1 furthest from the panel)

| Node | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------|----|----|----|----|----|----|----|----|----|----|
| 1 | ON | | | | | | | | ON | ON |
| 2 | | ON | | | | | | | ON | |
| 3 | ON | ON | | | | | | | ON | |
| 4 | | | ON | | | | | | ON | |
| 5 | ON | | ON | | | | | | ON | |
| 6 | | ON | ON | | | | | | ON | |
| 7 | ON | ON | ON | | | | | | ON | |
| 8 | | | | ON | | | | | ON | |
| 9 | ON | | | ON | | | | | ON | |
| 10 | | ON | | ON | | | | | ON | |
| 11 | ON | ON | | ON | | | | | ON | |
| 12 | | | ON | ON | | | | | ON | |
| 13 | ON | | ON | ON | | | | | ON | |
| 14 | | ON | ON | ON | | | | | ON | |
| 15 | ON | ON | ON | ON | | | | | ON | |
| 16 | | | | | ON | | | | ON | |
| 17 | ON | | | | ON | | | | ON | |
| 18 | | ON | | | ON | | | | ON | |
| 19 | ON | ON | | | ON | | | | ON | |
| 20 | | | ON | | ON | | | | ON | |
| 21 | ON | | ON | | ON | | | | ON | |
| 22 | | ON | ON | | ON | | | | ON | |
| 23 | ON | ON | ON | | ON | | | | ON | |
| 24 | | | | ON | ON | | | | ON | |

## Menu System

The main menu is accessed by pressing the **ENT** key from the ILE splash screen.  This will present you with a screen giving the following options:

```
Event History
Parameters
I/O
Lift Viewer
Speech & Ind
Allocations
Drive
Parameter Control
```

You can traverse the menu system using the **UP** and **DN** buttons.  If you wish to select an option then please press the **ENT** button.  If you wish to go back in the menu structure please press the **ESC** button.

### Event History

```
      Event History
          >
Event Log
Event Viewer
Clr CAN-X Events
Journey Counter
Door Cycle Counter
Reset Counter
Drive Fault Log
```

The Event history menu allows you to access the log of events and also gives you the ability to clear the events on the processor.

The number of door cycles and journeys that have occurred on the lift can be viewed and these counters can also be reset if required.  CAN monitoring can also be accessed, along with drive faults.  See separate drive manual for more detail.

### The Event Log

```
Event History 01-07 >
SELECTOR RESET BOTTOM
LOST DIR ON HIGH
SPEED
MSU STUCK
SLOWED: DN SLOW LIMIT
EMERGENCY STOP
FAULT RELAY DROPPED
PRIORITY SERVICE 1
```

The events being displayed in this example are number 1-7 in the event log, and the log can be traversed using the **UP** and **DN** buttons, or each page can be skipped by using the **LEFT** and **RIGHT** arrow buttons.  If it is possible to skip a page then the '<' and/or '>' characters are displayed in the top left and right hand corners of the screen respectively.

```
   INSPECTION CONTROL
Event List No=41
Position=1     Occur=1
18/01/2010    14:32:28
_____
 Lift operating under
  Inspection control
   Engineer on site
```

More information about an event can be accessed by pressing the **ENT** button while an event is selected.  This will give you information about the position the lift was at, the number of occurrences of the event, the time and date, and if relevant possible solutions to the problem.  In order to return to the event log, press the **ESC** button.

### Parameters

The parameters section of the menu has a number of sub menus as follows:

- Job & System
- Doors

- General
- Homing
- Travel
- Hydraulic

- Anti Nuisance
- OSI Indication
- Time & Date
- ERET 1-6

For a full list of the parameters and their constraints please see appendix A of this manual or contact ILE for assistance. For information on the functionality that the parameters provide see the Parameters Section of this manual.

**Passwords**

When attempting to edit a parameter if you have not entered the relevant password level the processor will prompt you with a message on the screen for the level required. In order to enter the password press the ENT and UP buttons on the keypad to shortcut to the password entry screen.

There are 2 password levels. Level 1 password is 111111, for the level 2 password please call ILE and ask for technical support. To enter a password the left and right arrow keys will move you through the characters, the down key will select a character and the up key will delete a character.

**I/O**

If you want to see what inputs are on then you can use the I/O viewer as follows.

```
          I/O
Edit Connected Nodes
View Connected Nodes
Edit Unused Nodes
View Unused Nodes
Edit Unused Mode Type
Call Acceptance
Set Lift Critical IO
```

The I/O screen gives a number of options for editing and viewing the nodes. Connected nodes are those currently connected to the system. If a node is faulty or has been removed from the system it will be in the unconnected section.

The call acceptance can also be set from here dictating where the call acceptance buzzer will sound.

```
       I/O Viewer
CAN 3 – P1 – 8:I/O
CAN 3 – P2 – 8:I/O
CAN 3 – P3 – 4:RELAY
CAN 2 – C1 – 8:I/O
CAN 2 – C2 – 8:I/O
CAN 2 – C3 – 4:RELAY
CAN 1 – L1 – 2:I/O
```

The node list screen details the CAN the node is on (P – Panel, C – Car, L – Landing) and the type of the node. For full explanation of these please contact ILE technical support.

Screens for I/O and RELAY are shown below, with highlighted I/O currently on.

```
Node P1-(8)I/O  1-4 >
[O] [DRV EN] [NI - NL]
[I] [EMER  ] [NI - NL]
[I] [CARL  ] [NI - NL]
[I] [LANL  ] [NI - NL]


      IO VIEWER
```

```
Node P3-RELAY   1-4
[O] [DNR_CHK ] [ NI ]
[O] [UPR CHK ] [ NI ]
[O] [DNR CHK ] [ NI ]
[O] [STR O/P ] [ NI ]
```

## Lift Viewer

```
NORMAL         | 8 ├
Motion=        | 7 ├
Doors= CLOSED  | 6 ├
EMER CARL LANL | 5 ├
UpV  DnV  DZ   | 4 ├
RS   LTr  STR  | 3 ├
D=   S=        | 2 ├
[  Clear  ]>   | 1 ├
■
```
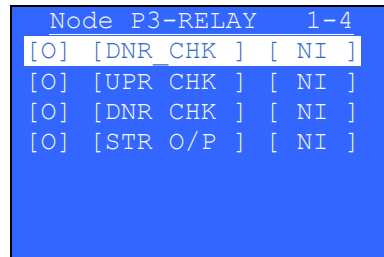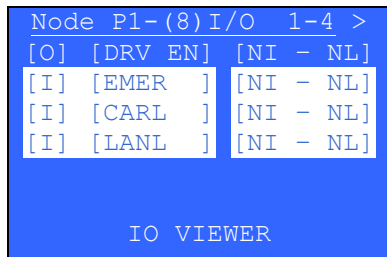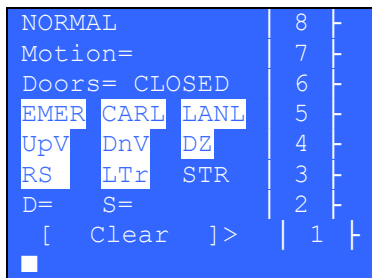
The Lift Viewer is the heart of the Skycom CAN-X, this screen gives a lot of information about the status of the lift. It details the lift mode, motion, direction of travel, doors status, vanes, reset, limit trip, start relay, destination, and speed, as well as providing the ability to enter any kind of call.

## Speech & Indicators

The Speech and Indicator menu allows the modification of speech positions and events, as well as I/O triggered messages, along with indicator floor designations, I/O triggered messages for the indicators and configuration of position in travel and enabling/disabling of the indicator hall lanterns. For further explanation of how to modify these parameters please refer to Appendix B or contact ILE for assistance.

## Allocations

The allocations menu provides an interface to change the allocations of the lift installation for all types of call, (car, landing up, landing down, and priority). This menu also provides the settings for timed allocations.

## Drive

The drive menu provides the interface to the Fuji drive, allowing the setting of parameters, the viewing of drive status information, and access to the setup wizards, one for the commissioning and one for the tuning. For further information about parameters please refer to the CAN-X Fuji Manual.

## Parameter Control

The parameter control menu allows the verification of parameters between the main processor and the display processor as well as access to factory setup, and password entry.

## LED Dimming

Illumination levels for car and landing pushes is configurable from the CPU, 7 levels of dimming are available to allow users to tailor the level to their requirements. DOP illumination level is also controlled from this setting.

## Parameters

### Job & System

The first 3 parameters, *Job Number*, *Customer Name*, and *Site Name* all provide information about the lift installation.

*Collective Type* details the way in which the calls are collected.

The *Number of Floors, Bottom Floor* and *Top Floor* give the basic amount of floors that the lift installation will service and the lower and upper bounds of the lift.

*Prepare to test con* allows the site engineer to put the lift into an intermediary state while calls are still being answered in readiness for putting the lift into full inspection/test control.

### Doors

The *Spec* of the doors details whether the doors on the lift installation are automatic or manual. The *ACK Feedback* parameter details the type of feedback acknowledgment the doors will give to the lift controller.

*DCR on When Closed* dictates whether you want the door close relay (DCR) on or off when the doors are fully closed and *DOR on when Opened* dictates whether you want to door open relay (DOR) on or off when the doors are fully opened. *DCR on when Running* dictates whether the door close relay (DCR) needs to be on to hold the doors closed during travel.

*Stop Closing on Locks* dictates when the DCR relay will be dropped by the lift controller.

*Adv Doors Opening* dictates whether the doors will start to open as the lift arrives at floor or once arrived at a floor.

*Quick Close* dictates whether the doors will close on a car call and bypass the dwell time or wait until the dwell time has passed before commencing the close sequence.

*Park Open* dictates whether the doors park open or closed.

*Relax Locks* dictates whether the doors need to be re closed before a travel can occur.

*SE Count* gives the threshold for the number of safe edge events seen before the doors park open.

*DLR Count* gives the threshold for the number of door light ray events seen before the doors nudge closed. In order to turn nudging off set to 0 in conjunction with DLR held time set to 0.

*Norm Const Open* and *Norm Const Close* dictate whether the normal operation of the doors requires constant pressure.

*Open on Init*, *Open on Reset*, *Open on Homing*, and *Open on Lost Dir* dictate the reaction of the doors and whether they will open or stay closed in each situation.

*Disable Doors* dictates whether the doors are in operation.

***Door Close on Rev*** dictates whether the doors need to close before accepting a reverse landing call at a floor when no other calls and no car calls have been entered in reaction to answering a landing call.

***DCR on Init*** dictates whether the door close relay needs to be on after initialisation to force a relaxed set of doors to be fully closed before any travel occurs.

***Reverse Time*** dictates the earliest amount of time after the close relay has been dropped that the open relay can be activated and vice versa.

***Car Preference Time*** is used only when the APB collective parameter has been set, landing calls are inhibited while this timer is still running.

***CC Drop Time*** dictates the time from the doors being fully closed to the time the door close relay drops.

***Lock Time*** dictates the amount of time after the doors have fully closed before the checking of the limits and the locks.

***DOP Held Time, SE Held Time, DLR Held Time*** give the threshold value of when the processor will ignore the input still being held and close the doors.   In order to turn nudging off set to 0 in conjunction with DLR Count set to 0.

***ACK Time*** is the amount of time allowed for the feedback from the doors to be given to the controller.

***Ramp Time*** is the time for a ramp to lift before travel will commence.

***Car LAN Dwell Time, LAN Dwell Time, Car Dwell Time, DOP Dwell Time, SE Dwell Time, DLR Dwell Time, Door Hold Dwell Time*** all give the threshold value when the processor will initiate the doors to close.

***Locktip Reopen Time*** is the amount of time after a locktip is seen that the processor will then attempt to cycle the doors to get the lift back in service.

***Landing Call Ignore*** is the threshold value at which the processor will ignore repeated future landing calls at a floor in order to let the lift car get away from that landing and give priority to the people already in the lift car.

***Door Close Prot Time*** and **Door *Open Prot Time*** give the threshold value when the processor will stop the current door sequence, this is in order to not burn out the door gear.

***Nudge Release Time*** is the threshold value after a nudge condition has occurred that the processor will release the condition, this is so that the lift can get away to answer calls but that at the next floor a nudge condition can be assessed if necessary.

**Delay Open After Stop** sets the delay between the lift car stopping and the door starting to open.

**General**

*No of Self Test* dictates the number of times the lift controller will attempt to get the lift back into service.

*Self Test Top Floor* and *Self Test Bot Floor* dictate the bounds of the self test, so if the lift is in the bottom half of the shaft a call will be entered according to the self test top floor parameter, and vice versa if the lift is in the top half of the shaft.

*Man Gate Late Cancel* keeps the acceptance on until the gates open.

*Position Outputs* dictates the type of the position outputs, they can be normal, binary, gray code or seven segment.

*Daylight Saving* automatically adjusts the real time clock according to GMT.

*LED Dimming* is the illumination level for car, landing pushes, and DOP illumination.

*Pre Flite Checking* dictates whether a check is made of the acknowledge feedback once the locks are made before a travel will commence.

*Reset Top Power* Init dictates whether the lift will reset to the top or bottom floor on a power initialisation.

*Dis CAR Acceptance* and *Dis LAN Acceptance* disable/enable the respective acceptances.

*Seven Segment Start* dictates whether the seven segment indictors start at 0 or 1.

*Self Test Time* is the amount after a lift fault that the self test will be initiated.

*Dive Time* is the amount of time before a dive is initiated on initialisation or when leaving inspection mode to enter normal mode.

*Speech Timeout Time* the amount of time before a timeout of communication event with the speech unit is logged.

*Eco Mode 1 Time* and *Eco Mode 2 Time* are the timers that dictate when the lift has been idle for a period of time and as a result certain devices will be shutdown.  The mode 2 timer starts when the mode 1 timer has timed out.

*Re-leveling* dictates whether the lift has the releveling facility.

*Show Limit Events* removes or includes the limit events in the event logger.

**Auto Reset Enable** is for ILE engineers use only.


**Homing**

*Homing Floor* is the floor the lift will home to after the lift has been idle for the *Homing Time*.

**Travel**

**Low Speed Prot Time** is the amount of time the lift will travel at low speed/levelling speed before reporting a fault.

**Start Fail Time** is the amount of time the controller will allow, after the travel outputs are set, before a start failure event is logged, if the correct feedback is not seen from the drive.

**Stop Time** is the amount of time, after seeing the second vane, before the controller will drop the travel and direction relays.

**Journey Time** is the amount of time allowed without seeing a px signal before the lift controller will issue a journey timer event.

**Pause Time** is the amount of time after the end of a journey before the controller will try to start another journey.

**Stop Fail Time** is the amount of time, after seeing the second vane, before which the controller will issue a str stop timeout event, if the str feedback has not been dropped by the drive.

**Ramp Fail Time** is the amount of time to see the ramp feedback input, otherwise no travel is attempted.

**Enable Time** is the amount of time, after the lift has stopped, before the enable output is dropped.

**Stuck Vane Time** is the amount of time that a vane needs to be on in order for the controller to issue a stuck vane event.

**Re-level Stop Time** is the amount of time, after seeing the second vane, before the controller will drop the travel and direction relays, when in a relevel condition.

**STR Delay Time** is the amount of time after UPR/DNR drop out that the STR output will be dropped.

**Up Direction** dictates the rotation of the motor for the up direction.


**Hydraulic**

**Hyd Homing Time** is the amount of time after normal homing has been achieved that the hydraulic homing call will be entered at the bottom floor of the lift.

**Max Relev Period** is the maximum time that the controller will allow the relevel output to be on.

**Relev Yoyo count** is the maximum number of times the controller will keep releveling, each time the lift successfully relevels at a floor a counter is incremented, when it exceeds this value it will no longer attempt to relevel, and will put a call into the bottom floor.

**Relev Yoyo Period** is the amount of time the controller will allow for the yoyo count to be incremented and eventually exceeded.


**Anti Nuisance**

**DOP Held Dump Calls** dictates whether, when the door open push is permanently held in, the calls in the system will get dumped or not.

**Num of Reverse Calls** this is the number of reverse calls that are allowed in the previous direction of travel just prior to a change in direction.

**Fwd Calls Remaining** this is the number of calls entered in front of the lift in its current direction of travel that are allowed if no light ray is seen repeatedly.

**Stops No Light Ray** is the number of stops with no door light ray being seen before all car calls will get cleared.

**Stuck Button Detect** is the amount of time a button is to be held before it will register a stuck button event.

**Stuck Button Reinit** is the amount of time, after seeing a stuck button event for a button, before it will reinitialise the button.

## OSI Indication

All parameters in this section dictate whether the out of service indication is shown or not.

## ERET 1-6

There are 6 emergency return profiles that are fully configurable using the following set of parameters.

**Name** is the name of the profile.

**Drop off Floor** this is the floor at which passengers, in the lift when the eret input is seen, will be dropped off at.

**Return Floor** is the floor the lift will return to once the drop off facility has been completed.

**Alt Return Floor** if the return floor can not be achieved this floor will be used instead.

**Const Pres Open** and **Const Pres Close** dictate whether constant pressure open and closed are used within the eret.

**Park Open** and **Park Closed** dictate what the doors do when arriving at a floor.

**LAN Call Open** dictates whether a landing call at the floor the lift car is at will open the door or not.

**Car Calls** dictates whether car calls are allowed in the eret.

**Enable DLR** dictates whether the DLR input is active or not.

**Dwell Time** is the time used for the door dwell while in the eret condition.

**Ph1 Clear Calls** dictates whether the calls are cleared or not when the eret condition is first entered.

**Ph2 Activation** dictates whether phase 2 of the eret needs an input to initiate it or not.

**Dive Power Init** dictates whether the lift will dive on a power initialisation in the eret.

**No Entry Sign** dictates whether the no entry sign output is set when in the eret condition.

**OSI Indication** dictates whether the out of service indicator is activated when in the eret condition.

**Ignore DOP** dictates whether the door open push is ignored or accepted in the eret condition.


**Speech and Indicators**

**Pos in Travel** dictates whether the position of the lift is annunciated as it passes each floor.
**Ind HLR Enable** dictates whether the indicators are to show the hall lanterns (ILE Indicators only).

**Full Volume, Hush Volume** sets the level of volume for the speech unit.


**Time & Date**

**Year, Month, Day, Hour**, and **Minute** allow the setting of the real time clock.

## APPENDIX A – Parameter List

**Job & System**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Job Number | | | | xxxx | | V |
| Customer Name | a-z | | | | | 1 |
| Site Name | a-z | | | | | 1 |
| Collective Type | Spec | | | Full Collective | | 2 |
| Prep to Test Control | Spec | | | Disabled | | 1 |
| Number of Floors | 0-9 | 2 | 24 | | 1 | 2 |
| Bottom Floor | 0-9 | 1 | 23 | | 1 | 2 |
| Top Floor | 0-9 | 2 | 24 | | 1 | 2 |

**Collective Type –** Full Collective/Down Collective/Non Sel Collective/APB
**Prep to Test Control –** Disabled/PTT Park Open/PTT Park Closed

**Doors**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Spec | Spec | | | Auto Car/Lan | | 2 |
| ACK Feedback | Spec | | | Door Limits | | 2 |
| DCR on when Closed | Yes/No | | | No | | 2 |
| DCR on when Running | Yes/No | | | No | | 2 |
| DOR on when Opened | Yes/No | | | No | | 2 |
| Stop Closing on Locks | Yes/No | | | No | | 2 |
| Adv Doors Opening | Yes/No | | | No | | 1 |
| Quick Close | Yes/No | | | Yes | | 1 |
| Park Open | Yes/No | | | No | | 1 |
| Relax Locks | Yes/No | | | No | | 1 |
| SE Count | 0-9 | 0 | 30 | 4 | 1 | 1 |
| DLR Count | 0-9 | 0 | 30 | 4 | 1 | 1 |
| Norm Const Open | Yes/No | | | No | | 2 |
| Norm Const Close | Yes/No | | | No | | 2 |
| Open on Init | Yes/No | | | Yes | | 1 |
| Open on Reset | Yes/No | | | Yes | | 1 |
| Open on Homing | Yes/No | | | Yes | | 1 |
| Open on Lost Dir | Yes/No | | | Yes | | 1 |
| Disable Doors | Yes/No | | | No | | 1 |
| Door Close on Rev | Yes/No | | | No | | 1 |
| DCR on Init | Yes/No | | | No | | 1 |

**Spec -** Auto CarLan/Auto Car Man Lan/Man Gates
**Ack Feedback –** Door Limits/DOC Input

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Reverse Time | MS | 20 | 1000 | 100 | 20 | 2 |
| Car Preference Time | MS | 0 | 30 | 1 | 1 | 2 |
| CC Drop Time | MS | 20 | 3000 | 400 | 20 | 2 |
| Lock Time | MS | 20 | 3000 | 1000 | 20 | 2 |
| DOP Held Time | S | 0 | 60 | 20 | 1 | 1 |
| SE Held Time | S | 0 | 60 | 20 | 1 | 1 |
| DLR Held Time | S | 0 | 60 | 20 | 1 | 1 |
| ACK Time | S | 0 | 10 | 2 | 1 | 2 |
| Ramp Time | S | 0 | 30 | 0 | 1 | 2 |
| CAR LAN Dwell Time | S | 0 | 60 | 7 | 1 | 1 |
| LAN Dwell Time | S | 0 | 60 | 5 | 1 | 1 |
| CAR Dwell Time | S | 0 | 60 | 3 | 1 | 1 |
| DOP Dwell Time | S | 0 | 60 | 4 | 1 | 1 |
| SE Dwell Time | S | 0 | 60 | 1 | 1 | 1 |
| DLR Dwell Time | S | 0 | 60 | 1 | 1 | 1 |
| Door Hold Dwell Time | S | 0 | 1200 | 45 | 1 | 1 |
| Locktip Reopen Time | S | 0 | 10 | 4 | 1 | 1 |
| Landing Call Ignore | S | 0 | 600 | 10 | 1 | 1 |
| Door Close Prot Time | S | 0 | 60 | 20 | 1 | 1 |
| Door Open Prot Time | S | 0 | 60 | 20 | 1 | 1 |
| Nudge Release Time | S | 0 | 60 | 5 | 1 | 1 |
| Delay Open After Stop | S | 0 | 10 | 0 | 1 | 1 |

**General**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| No of Self Test | 0-9 | 0 | 10 | 5 | 1 | 1 |
| Self Test Top Floor | 0-9 | 1 | 24 | 8 | 1 | 1 |
| Self Test Bot Floor | 0-9 | 1 | 24 | 1 | 1 | 1 |
| Man Gate Late Cancel | Yes/No | | | No | | 1 |
| Position Outputs | Spec | | | Normal | | 1 |
| Daylight Saving | Yes/No | | | Yes | | 1 |
| LED Dimming | 0-9 | 0 | 7 | 3 | | 1 |
| Pre Flite Checking | Yes/No | | | Yes | | 1 |
| Reset Top Power Init | Yes/No | | | No | | 1 |
| Dis CAR Acceptance | Yes/No | | | No | | 2 |
| Dis LAN Acceptance | Yes/No | | | No | | 2 |
| Seven Segment Start | 0-9 | 0 | 1 | 0 | 1 | 1 |
| Self Test Time | S | 0 | 600 | 120 | 1 | 1 |
| Dive Time | S | 0 | 600 | 15 | 1 | 2 |
| Speech Timeout Time | S | 0 | 600 | 30 | 1 | 2 |
| ECO Mode 1 Time | MS | 1 | 20 | 10 | 1 | 1 |
| ECO Mode 2 Time | MS | 1 | 20 | 10 | 1 | 1 |
| Re-leveling | Yes/No | | | No | | 1 |
| Show Limit Events | Yes/No | | | Yes | | 1 |
| Auto Reset Enable | Yes/No | | | No | | View Only |

**Position Outputs –** Normal/Binary/Gray Code/Seven Segment

**Homing**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Homing Time | S | 20 | 1200 | 360 | 1 | 1 |
| Homing Floor | 0-9 | 1 | 24 | 1 | 1 | 1 |

**Travel**

| Name | Type | Min | Max | Default | Step | Password Level |
|------|------|-----|-----|---------|------|----------------|
| Low Speed Prot Time | S | 0 | 120 | 20 | 1 | 1 |
| Start Fail Time | S | 0 | 30 | 2 | 1 | 1 |
| Stop Time | MS | 20 | 3000 | 200 | 20 | 1 |
| Journey Time | S | 0 | 120 | 20 | 1 | 1 |
| Pause Time | S | 0 | 10 | 2 | 1 | 1 |
| Stop Fail Time | S | 0 | 30 | 2 | 1 | 1 |
| Ramp Fail Time | MS | 20 | 5000 | 0 | 20 | 1 |
| Enable Time | MS | 20 | 3000 | 200 | 20 | 1 |
| Stuck Vane Time | S | 0 | 30 | 10 | 1 | 1 |
| Re-Level Stop Time | MS | 20 | 3000 | 200 | 20 | 1 |
| STR Delay Time | MS | 0 | 3000 | 200 | 20 | 1 |
| UP Direction | Spec | | | Forward | | 2 |

**UP Direction –** Forward/Reverse

**Hydraulic**

| Name | Type | Min | Max | Default | Step | Password Level |
|------|------|-----|-----|---------|------|----------------|
| Hyd Homing Time | S | 0 | 1200 | 0 | 1 | 1 |
| Max Relev Period | S | 0 | 60 | 20 | 1 | 2 |
| Relev Yoyo Count | 0-9 | 1 | 24 | 11 | 1 | 2 |
| Relev Yoyo Period | S | 0 | 120 | 60 | 1 | 2 |

**Anti Nuisance**

| Name | Type | Min | Max | Default | Step | Password Level |
|------|------|-----|-----|---------|------|----------------|
| DOP Held Dump Calls | Yes/No | | | Yes | | 1 |
| Num of Reverse Calls | 0-9 | 0 | 10 | 3 | 1 | 1 |
| Fwd Calls Remaining | 0-9 | 0 | 10 | 3 | 1 | 1 |
| Stops No Light Ray | 0-9 | 1 | 10 | 3 | 1 | 1 |
| Stuck Button Detect | S | 10 | 50 | 20 | 1 | 1 |
| Stuck Button Reinit | M | 1 | 20 | 2 | 1 | 1 |

**OSI Indication**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Error In Position | Yes/No | | | Yes | | 1 |
| Double Journey Time | Yes/No | | | Yes | | 1 |
| Hydraulic Overtravel | Yes/No | | | Yes | | 1 |
| Start Failure | Yes/No | | | Yes | | 1 |
| Relevel Error | Yes/No | | | Yes | | 1 |
| Open Prot Fault | Yes/No | | | Yes | | 1 |
| Close Prot Fault | Yes/No | | | Yes | | 1 |
| Lan Lock Failure | Yes/No | | | Yes | | 1 |
| Car Lock Failure | Yes/No | | | Yes | | 1 |
| Motion Failure | Yes/No | | | Yes | | 1 |
| Inspection | Yes/No | | | Yes | | 1 |
| Drive Tripped | Yes/No | | | Yes | | 1 |
| LW110 | Yes/No | | | No | | 1 |
| Thermistor Tripped | Yes/No | | | Yes | | 1 |
| Prepare To Test | Yes/No | | | Yes | | 1 |
| EMER Stop Broken | Yes/No | | | Yes | | 1 |
| Both Resets | Yes/No | | | Yes | | 1 |
| Pre Flite Failure | Yes/No | | | Yes | | 1 |
| Stuck Vanes | Yes/No | | | Yes | | 1 |
| Proving Circuit Failure | Yes/No | | | Yes | | 1 |

**ERET 1-6**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Name | a-z | | | | | 1 |
| Drop off Floor | 0-9 | 0 | 24 | 0 | 1 | 1 |
| Return Floor | 0-9 | 0 | 24 | 1 | 1 | 1 |
| Alt Return Floor | 0-9 | 0 | 24 | 0 | 1 | 1 |
| Const Press Open | Yes/No | | | No | | 2 |
| Const Press Close | Yes/No | | | No | | 2 |
| Park Open | Yes/No | | | No | | 1 |
| Park Closed | Yes/No | | | No | | 1 |
| LAN Call Open | Yes/No | | | No | | 1 |
| Car Calls | Yes/No | | | No | | 1 |
| Enable DLR | Yes/No | | | No | | 1 |
| Dwell Time | 0-9 | 0 | 180 | 5 | 1 | 1 |
| Ph1 Clear Calls | Yes/No | | | No | | 1 |
| Ph2 Activation | Yes/No | | | No | | 1 |
| Dive Power Init | Yes/No | | | No | | 1 |
| No Entry Sign | Yes/No | | | No | | 1 |
| OSI Indication | Yes/No | | | Yes | | 1 |
| Ignore DOP | Yes/No | | | Yes | | 1 |

**Speech & Indicator**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Pos in Travel | Yes/No | | | Yes | | 1 |
| Ind HLR Enable | Yes/No | | | Yes | | 1 |
| Full Volume | 0-9 | 0 | 10 | 5 | | |
| Hush Volume | 0-9 | 0 | 10 | 5 | | |

**Time & Date**

| Name | Type | Min | Max | Default | Step | Password Level |
|---|---|---|---|---|---|---|
| Year | 0-9 | 7 | 99 | 9 | | 1 |
| Month | 0-9 | 1 | 12 | 1 | | 1 |
| Day | 0-9 | 1 | 31 | 1 | | 1 |
| Hour | 0-9 | 0 | 23 | 1 | | 1 |
| Minute | 0-9 | 0 | 59 | 1 | | 1 |

## APPENDIX B – Speech List

| | | | | |
|---|---|---|---|---|
| 1: | THIS LIFT IS OVERLOADED | | 65: | SEVENTEEN |
| 2: | THIS LIFT IS UNDER MAINTENANCE CONTROL | | 66: | EIGHTEEN |
| 3: | THIS LIFT IS OUT OF SERVICE | | 67: | NINETEEN |
| 4: | THIS LIFT IS UNDER FIRE CONTROL OPERATION | | 68: | TWENTY |
| 5: | THIS LIFT IS UNDER EVACUATION CONTROL | | 69: | TWENTYX |
| 6: | MAIN EXIT FLOOR | | 70: | THIRTY |
| 7: | THIS LIFT IS RETURNING | | 71: | THIRTYX |
| 8: | TO | | 72: | FORTY |
| 9: | TO THE | | 73: | FORTYX |
| 10: | THIS LIFT IS RETURNING UNDER FIRE SERVICE | | 74: | FIFTY |
| 11: | THIS LIFT IS | | 75: | SUB BASEMENT |
| 12: | ARRIVING AT | | 76: | THIS WAY OUT |
| 13: | xxxxxxxxxx | | 77: | 1ST |
| 14: | THE ALARM HAS BEEN ACTIVATED | | 78: | 2ND |
| 15: | ACCESS | | 79: | 3RD |
| 16: | UNDER GOODS CONTROL | | 80: | 4TH |
| 17: | THIS LIFT IS UNDER SERVICE CONTROL | | 81: | 5TH |
| 18: | UNDER FIRE FIGHTERS CONTROL | | 82: | 6TH |
| 19: | CAR | | 83: | 7TH |
| 20: | PLEASE MIND THE DOORS | | 84: | 8TH |
| 21: | LIFT | | 85: | 9TH |
| 22: | ON TEST | | 86: | 10TH |
| 23: | FAILED TO START | | 87: | 11TH |
| 24: | COMING | | 88: | 12TH |
| 25: | DOORS OPENING | | 89: | 13TH |
| 26: | DOORS CLOSING | | 90: | 14TH |
| 27: | STAND CLEAR | | 91: | 15TH |
| 28: | STAND CLEAR OF THE DOORS | | 92: | 16TH |
| 29: | PLEASE REDUCE WEIGHT IN LIFT | | 93: | 17TH |
| 30: | PLEASE EXIT LIFT | | 94: | 18TH |
| 31: | GOING UP | | 95: | 19TH |
| 32: | GOING DOWN | | 96: | 20TH |
| 33: | UNDER EVACUATION CONTROL | | 97: | xxxxxxxxxx |
| 34: | UNDER PRIORITY SERVICE | | 98: | A |
| 35: | UNDER FIRE SERVICE | | 99: | B |
| 36: | UNDER FIRE CONTROL OPERATION | | 100: | C |
| 37: | UNDER FIRE CONTROL | | 101: | D |
| 38: | UPPERX | | 102: | E |
| 39: | LOWERX | | 103: | F |
| 40: | XFLOOR | | 104: | G |
| 41: | FLOORX | | 105: | H |
| 42: | XLEVEL | | 106: | I |
| 43: | LEVELX | | 107: | J |
| 44: | ZERO | | 108: | K |
| 45: | MINUS ONE | | 109: | L |
| 46: | BASEMENT | | 110: | M |
| 47: | MINUS TWO | | 111: | BEING SERVICED |
| 48: | GROUND | | 112: | UNAUTHORISED CAR TOP ACCESS |
| 49: | ONE | | 113: | PENTHOUSE |
| 50: | TWO | | 114: | PODIUM |
| 51: | THREE | | 115: | CAR PARK |
| 52: | FOUR | | 116: | MEZZANINE |
| 53: | FIVE | | 117: | RECEPTION |
| 54: | SIX | | 118: | SERVICE |
| 55: | SEVEN | | 119: | SHOP |
| 56: | EIGHT | | 120: | FRONT |
| 57: | NINE | | 121: | REAR |
| 58: | TEN | | 122: | MINUS |
| 59: | ELEVEN | | 123: | BING |
| 60: | TWELVE | | 124: | BONG |
| 61: | THIRTEEN | | 125: | BING BONG |
| 62: | FOURTEEN | | 126: | WAY OUT |
| 63: | FIFTEEN | | 127: | PAUSE (100 MilliSeconds) |
| 64: | SIXTEEN | | | |

## APPENDIX C – Event List

| | |
|---|---|
| EMERGENCY STOP | The live voltage feed to input EMER was removed |
| LAN LOCK TIP HIGH SPD | The live voltage feed to input LANL was removed on high speed |
| CAR LOCK TIP HIGH SPD | The live voltage feed to input CARL was removed on high speed |
| LAN LOCK TIP LOW SPD | The live voltage feed to input LANL was removed on low speed |
| CAR LOCK TIP LOW SPD | The live voltage feed to input CARL was removed on low speed |
| LAN LOCK NOT MAKING | Landing lock failed to make contact whilst doors closing |
| CAR LOCK NOT MAKING | Car lock failed to make contact whilst doors closing |
| FAILURE TO START | No STR input to processor, check THERM, limit, RunContact, PFRR |
| RE-LEVELING ERROR | Lift error whilst releveling due to wrong or no vanes |
| RE-LEVELING TIMEOUT | Lift releveling error due to excess releveling time |
| SELECTOR RESET BOTTOM | the lift has reset to bottom floor: input RSD on |
| LOW SPEED TIMER | Lift travelling on low speed exceeded low speed protection timer |
| JOURNEY TIMER | Lift travelling on high speed and exceeded journey time |
| DOOR OPEN PROT TIMER | Door timer exceeded whilst doors opening |
| DOOR CLOSE PROT TIMER | Door timer exceeded whilst doors closing |
| LAN LOCK FAILED | Landing lock failed to make contact 4 times consecutively |
| CAR LOCK FAILED | Car lock failed to make 4 times consecutively |
| RE-LEVELING FAULT | Releveling fault, check levelling vanes |
| 110% OVERLOADED | The lift has been overloaded by 10% check car/load device |
| MOTION FAILURE | STR input lost when moving, check THERM, limit, RunContact, PFRR |
| 90% OVERLOADED | The lift has been loaded with 90% load, check car/load device |
| RE-LEVELING YOYO ERR | Releveling error doe to excess yoyo levels in yoyo relev time |
| HYDRAULIC OVERTRAVEL | Hydraulic fault overtravel at top floor input HYDOTL asserted |
| MSU AND MSD STUCK | MSU MSD levelling proximity switches stuck on |
| MSU STUCK | MSU up levelling proximity stuck on |
| MSD STUCK | MSD dn levelling proximity stuck on |
| SELECTOR RESET TOP | The lift has reset to the top floor, input RSU on |
| RESETS TOP AND BOT ON | Selector resets top and bottom, both on, inputs RSU/RSD on |
| TOP FLOOR SELF TEST | Lift has performed top floor self test |
| BOT FLOOR SELF TEST | Lift has performed bottom floor self test |
| SELF TEST PASSED | Self test performed by the lift passed |
| SELF TEST FAILED | Self test performed by the lift failed |
| LEVEL VANE FAULT UP | Processor seen the wrong vane going UP, MSD instead of MSU |
| LEVEL VANE FAULT DN | Processor seen the wrong vane going DN, MSU instead of MSD |
| THERMISTOR TRIPPED | Motor thermistors tripped |
| SLOWED: UP SLOW LIMIT | Lift slowed on limit instead of PX vane, check vanes/tapehead |
| SLOWED: DN SLOW LIMIT | Lift slowed on limit instead of PX vane, check vanes/tapehead |
| STR STOP TIMEOUT | Processor time dout whilst waiting for STR input to disable |
| PRIORITY SERVICE 1 | Lift operating according to priority service 1 |
| PRIORITY SERVICE 2 | Lift operating according to priority service 2 |
| PRIORITY SERVICE 3 | Lift operating according to priority service 3 |
| PRIORITY SERVICE 4 | Lift operating according to priority service 4 |
| PRIORITY SERVICE 5 | Lift operating according to priority service 5 |
| PRIORITY SERVICE 6 | Lift operating according to priority service 6 |
| PRIORITY SERVICE 7 | Lift operating according to priority service 7 |
| PROCESSOR REBOOTED | The processor has rebooted whilst the power was on |
| INSPECTION CONTROL | Lift operating under inspection control, engineer on site |
| PREP TO TEST CONTROL | Lift operating under prepare to test control |
| STUCK CAR BUTTON | Stuck button in lift car, check car pushes |
| STUCK UP LAN BUTTON | Stuck button on landing, check UP landing pushes |
| STUCK DN LAN BUTTON | Stuck button on landing, check DN landing pushes |
| STR INPUT HELD ON | STR input held on lift will not restart check, BKC, STR, MC |
| PRE FLITE CHK FAILED | Short circuit detected on the locks when doors fully open |
| NODE/NODES REMOVED | Lift travel inhibited due to removal of node |
| NODE/NODES ADDED | Lift travel inhibited due to addition of node |
| NODE TYPE CHANGED | IO board type changed, possible faulty board or corrupt data |
| PX SIGNAL FAULT | PX signal stuck on or on with MSU/MSD sequence incorrect |
| LOW SPEED ERROR FAULT | Low speed timer timed four time consecutively |
| CAR LOCK TIP FAIL | Locks failed to make after locktip on doors |
| DOOR OPEN PUSH HELD | Door open push held, all calls cancelled |

| | |
|---|---|
| SAFE EDGE HELD | Safe edge held all calls cancelled |
| DETECTOR EDGE HELD | Detector edge held, check door light ray |
| SPEECH UNIT COMS LOST | Serial communication to speech unit lost, check cables |
| SPEECH UNIT COMS REST | Serial communication to speech unit restored |
| ACK F.BAK NOT SEEN OP | Door open limit/doc feedback not seen within ack timer |
| ACK F.BAK NOT SEEN CL | Door close limit/doc feedback not seen within ack timer |
| SE COUNT EXCEEDED | Lift out of service safe edge repeatedly operated |
| DLR COUNT EXCEEDED | Door light ray seen repeatedly, nudging invoked |
| DOOR CLOSE PROT FAULT | Door close protection timeout seen repeatedly |
| START FAILURE | No STR input to micro processor check THERM limit, RunContact, PFRR |
| LAN LOCKTIP FAILURE | Lan locks not remade after locktip timeout |
| PRE FLIGHT CHK FAULT | Short circuit detected on the locks when doors fully open |
| DOOR OPEN PROT FAULT | Repeated door open protection timeouts |
| CRITICAL I/O LOST | Nodes with critical I/O have been removed.  Reconnect or edit I/O |
| FAULT RELAY DROPPED | Lift out of service due to unsafe panel condition |
| DRIVE TRIPPED | Check fault logger on drive |
| PROVING CIRCUIT FAULT | Check N/C contacts into proving circuit input on processor |
| PROVING CIRCUIT FAIL | Check N/C contacts into proving circuit input on processor |
| COUNTER/TIMER CLEARED | Counter / timer cleared by handheld or PC |
| UMR / PLR FLR | Pre-lock or unintended movement device failure |
| UMR/PLR TIP ON LOW SP | Pre-lock or unintended movement device failure |
| UMR/PLR TIP ON HI SP | Pre-lock or unintended movement device failure |
| CAN BUS 1 FAULT | Check for short circuit or reverse connection |
| CAN BUS 2 FAULT | Check for short circuit or reverse connection |
| CAN BUS 3 FAULT | Check for short circuit or reverse connection |
| CAN BUS 4 FAULT | Check for short circuit or reverse connection |
| PANEL NODE X ALERT | Check no coiled CAN cable. Only last node terminating resistor |
| CAR NODE X ALERT | Check no coiled CAN cable. Only last node terminating resistor |
| LANDING NODE X ALERT | Check no coiled CAN cable. Only last node terminating resistor |
| PANEL NODE X ADDED | An unconnected node has been detected and joined the network |
| CAR NODE X ADDED | An unconnected node has been detected and joined the network |
| LANDING NODE X ADDED | An unconnected node has been detected and joined the network |
| PANEL NODE X REMOVED | A connected node has been removed/rejected from the network |
| CAR NODE X REMOVED | A connected node has been removed/rejected from the network |
| LAN NODE X REMOVED | A connected node has been removed/rejected from the network |
| PANEL NODE X REBOOT | A connected node had momentary power loss |
| CAR NODE X REBOOT | A connected node had momentary power loss |
| LAN NODE X REBOOT | A connected node had momentary power loss |
| PANEL NODE X EDIT | A connected node I/O was edited by the user with PC/keypad |
| CAR NODE X EDIT | A connected node I/O was edited by the user with PC/keypad |
| LAN NODE X EDIT | A connected node I/O was edited by the user with PC/keypad |
| CANBUS 1 NODE HEARTBEAT | Check node connected/powered, CAN S/C or reverse connection |
| CANBUS 2 NODE HEARTBEAT | Check node connected/powered, CAN S/C or reverse connection |
| CANBUS 3 NODE HEARTBEAT | Check node connected/powered, CAN S/C or reverse connection |
| PROCESSOR POWERED UP | The processor has been powered up |
| LIMIT TRIP | The limit input has been tripped |
| LTR FEEDBACK ERROR | Both limits failed during initialisation |
| DN LIMIT FAIL | Down limit failed during initialisation |
| UP LIMIT FAIL | Up limit failed during initialisation |
| FIND ERROR | Check movement of lift in inspection, check reser/limit/vanes |
| DOOR LIMITS LOST | Door feedback was lost during travel check door limits |

## APPENDIX D – INPUT LIST

| | | |
|---|---|---|
| LU1 | LD20 | TEST 2 |
| LU2 | LD21 | T OPEN |
| LU3 | LD22 | T CLOSE |
| LU4 | LD23 | TST UP1 |
| LU5 | LD24 | TST UP2 |
| LU6 | CP1 | TST UP3 |
| LU7 | CP2 | TST DN1 |
| LU8 | CP3 | TST DN2 |
| LU9 | CP4 | TST DN3 |
| LU10 | CP5 | D OL |
| LU11 | CP6 | D CL |
| LU12 | CP7 | D OC |
| LU13 | CP8 | D HOLD |
| LU14 | CP9 | D DIS |
| LU15 | CP10 | D ZONE |
| LU16 | CP11 | HYDOTL |
| LU17 | CP12 | BATT OP |
| LU18 | CP13 | RESET |
| LU19 | CP14 | UP VANE |
| LU20 | CP15 | DN VANE |
| LU21 | CP16 | LW90 |
| LU22 | CP17 | LW110 |
| LU23 | CP18 | RAMP FB |
| LD2 | CP19 | THERM |
| LD3 | CP20 | ERET1 |
| LD4 | CP21 | ERET2 |
| LD5 | CP22 | ERET3 |
| LD6 | CP23 | ERET4 |
| LD7 | CP24 | ERET5 |
| LD8 | DOP | ERET6 |
| LD9 | DCP | PH2 ACT |
| LD10 | STR | ERET 1A |
| LD11 | SE | ERET 2A |
| LD12 | DLR | ERET 3A |
| LD13 | EMER | ERET 4A |
| LD14 | CARL | ERET 5A |
| LD15 | LANL | ERET 6A |
| LD16 | PROVING | ENG OS1 |
| LD17 | LMT TR | ENG OS2 |
| LD18 | DRV TR | * OSI * |
| LD19 | TEST 1 | * ENG * |

## APPENDIX E – OUTPUT LIST

| | | |
|---|---|---|
| LU1 | LD20 | NUDGE |
| LU2 | LD21 | D HOLD |
| LU3 | LD22 | D ZON I |
| LU4 | LD23 | D OL I |
| LU5 | LD24 | SE I |
| LU6 | CP1 | HSR |
| LU7 | CP2 | MSU I |
| LU8 | CP3 | MSD I |
| LU9 | CP4 | STOP |
| LU10 | CP5 | TEST I |
| LU11 | CP6 | STR OP |
| LU12 | CP7 | STR OPD |
| LU13 | CP8 | DRV EN |
| LU14 | CP9 | ECO M1 |
| LU15 | CP10 | ECO M2 |
| LU16 | CP11 | RAMP |
| LU17 | CP12 | OSI |
| LU18 | CP13 | LW90 I |
| LU19 | CP14 | LW 110 I |
| LU20 | CP15 | NO E SI |
| LU21 | CP16 | RE-LEV |
| LU22 | CP17 | GATE OP |
| LU23 | CP18 | ERET1 I |
| LD2 | CP19 | ERET2 I |
| LD3 | CP20 | ERET3 I |
| LD4 | CP21 | ERET4 I |
| LD5 | CP22 | ERET5 I |
| LD6 | CP23 | ERET6 I |
| LD7 | CP24 | ALRM FI |
| LD8 | DOP | IU |
| LD9 | DCP | ID |
| LD10 | HLRU | STAR |
| LD11 | HLRD | DELTA |
| LD12 | UPR | POS 1 |
| LD13 | DNR | POS 2 |
| LD14 | UPR CHK | POS 3 |
| LD15 | DNR CHK | POS 4 |
| LD16 | UPR DEL | POS 5 |
| LD17 | DNR DEL | POS 6 |
| LD18 | DOR | POS 7 |
| LD19 | DCR | POS 8 |