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## TECHNICAL MANUAL FOR THE ALMEGA MICROPROCESSOR SYSTEM *“POSITIONING SYSTEM SUPPLEMENT”*

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## 1) Introduction

The Positioning System has been designed to enhance the lift installation regarding mainly position accuracy, ride quality and floor to floor travel times. Also, due to the enhanced technology, the amount of shaft equipment is reduced, and setup time is greatly reduced.

The positioning system requires three main components, the **lift control system** with position, distance, and speed control software algorithms, a **position encoder** which provides an absolute position, and a **motor drive** which is able to regulate accurately the speed of the motor and hence lift. These three components work in conjunction with each other to provide the enhancements as described. The lift controller acts as the master to all the other slave devices, gathering positioning information, and issuing speed commands etc.

Position accuracy is achieved by constant monitoring of the absolute position. The positioning software calculates the speed profiles required to move the lift a target distance. During deceleration, the target profile is monitored and updated (if necessary) allowing correction for under / overshoot. The amount of correction is limited within specified jerk limits. Using this system, the lift will travel directly to the specified target position “Direct to Floor”, without the need for any level speed, with an accuracy of  $\pm 1$ mm.

An improved ride quality is achieved since the lift control system has better control of the acceleration / deceleration phases. During the main parts i.e. starting, stopping, and transitions to and from target speed, the lift control system provides adjustments so that softer starting and stopping is achieved, also vibration is greatly reduced. When the system is correctly configured, starting and stopping should be almost undetectable from within the lift car.

The system is much easier to install / setup than conventional “tapehead” / shaft switching systems. Vanes for stepping, and stopping are eliminated since the system automatically steps and stops using the absolute position information. A physical shaft vane, mounted at floor level is used for automatic learning of the lift shaft positions, and as a floor level backup. Additional vanes may be added for safety re-levelling functions.

The floor levels are settable via software parameters, and the stepping of the lift position is automatic. Upon first installation a “learning run” will normally be carried out to learn the shaft positions. The lift travels from the bottom position to the top position, and back again on reduced speed. As the lift travels past the floor level zone vanes, a position reading is recorded. Hopefully little or no adjustment to the floor levels will be carried out, to complete the setting of the floor levels.

Floor to floor travel times are reduced mainly due to the elimination of a level speed / approach speed. Traditional systems require a level speed to achieve stopping accuracy; however this increases the floor to floor time. With the “Direct to Floor approach” a reduction in floor to floor travel time of typically 33% (based upon a travel distance of 3M) is expected. Thus the saving over a number of journeys is considerable. Also the system is able to select different speeds for different floor heights. Hence the number of speed selections, are effectively unlimited. This also improves floor to floor times since the system is dynamic in its approach to varying shaft conditions, and selecting the maximum achievable speed.

The Windows application software provides an excellent user / diagnostic interface for the positioning system. Parameter settings, speed profile / floor level adjustments, monitoring, and diagnostics are all accessible. The software will work on any IBM compatible P.C. or laptop (250MHz or higher) with windows version XP, or Vista.

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## **2) List of Equipment**

- 1) Lift Control System with Position Device Fitted (Options as below)
  - a. Schmersal “USP CANopen”
- 2) Lift Floor Level Sensor
  - a. Learning Run Position Detection
  - b. Re-levelling Vane
- 3) Local or Remote Lap top / P.C. (*for monitoring programming*).
- 4) 1 Serial Communication Cable (*RS232 (non-crossed Male/Female) link between processor & laptop*).

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### 3) Positioning System Block Diagram / Overview

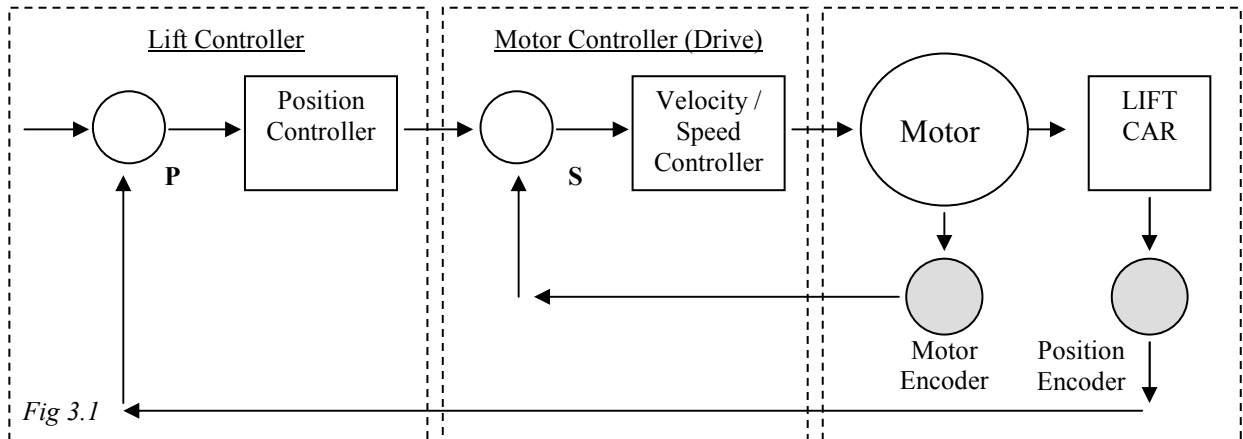


Fig 3.1 above shows the Positioning System and associated components, Lift Controller, Motor Controller (Drive), Motor, Motor Encoder, Lift Car, and Position Encoder. There are two main control loops, **Speed** and **Position**. The Drive controls the **speed** loop via the Motor and Motor Encoder. The Lift Controller controls the **position** loop via the Lift car, and position encoder. Direct approach to floor level (Direct to Floor) can be achieved once these two control loops are operational. An “Open Loop” lift control system refers to a Drive without a Motor Encoder, therefore the speed control loop is not operational. It is therefore unlikely that “Direct to Floor” will be achieved unless the motor maintains closely the speed command which it is given.

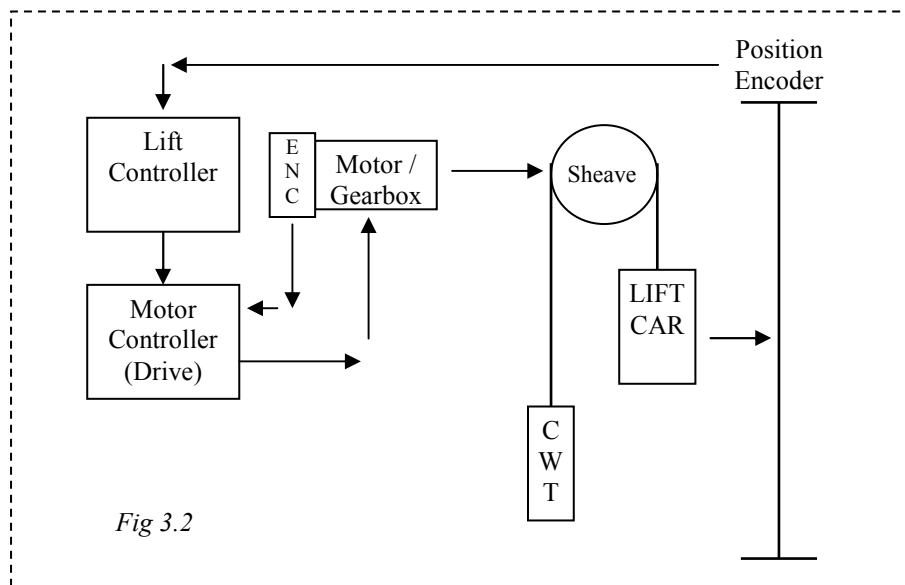
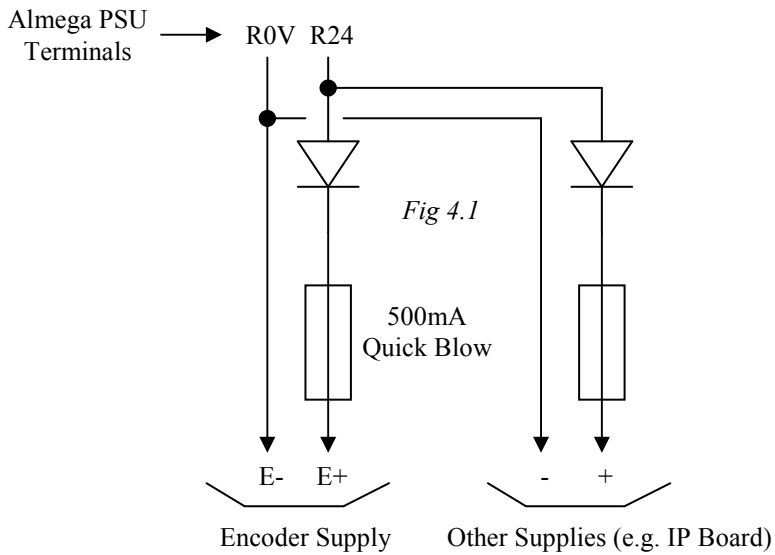


Fig 3.2 above shows the Positioning System with a more physical representation. The Position encoder in the lift shaft provides absolute position and speed of the lift car. The lift controller uses this information to stop accurately and consistently at floor level. The Lift control system is connected to the Position Encoder via a serial communication Link. This link is usually implemented using CANopen (a standardisation of the CAN (Controller Area Network) Application Layer). The Lift control system is also connected to the Motor Controller (Drive) via a serial communication Link. This link is usually implemented using RS422 (serial balanced differential communications).

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#### 4) Power Supply Requirements and Fusing

The Supply to the Position Device is derived from the Almega Regulated power supply output. A regulated supply ( $\pm 5\%$ ) is used because some position devices require a low tolerance in power supply fluctuation with respect to load. The supply is rated at (+24V, 2A). Power supply consumption for different manufacturers of position devices may vary, therefore a Fuse rating to suit the majority has been chosen as in Fig4.1 below.



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## 5) Serial Communication Types

### 5.1) RS232

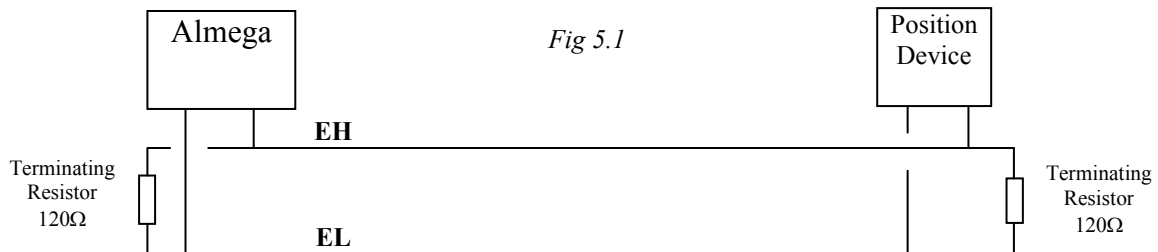
The Almega is fitted with an RS232 port, access to which is through the RS232 D-type connector, on the front of the board. Engineers on site can connect to this port (via a lap-top / P.C.) to access information directly from all the lifts. Monitoring of the Position device, Drive Profile, and Drive System can be achieved through this port.

### 5.2) CAN

The Almega CAN connection (CAN3) is wired into the Position Device (CANopen) interface. From this, mainly speed / position information is sent back to the Almega. Also during initialisation, selected information from the CANopen object map is transferred to the Almega.

#### Bus incorporating Lift Controller and Position Device

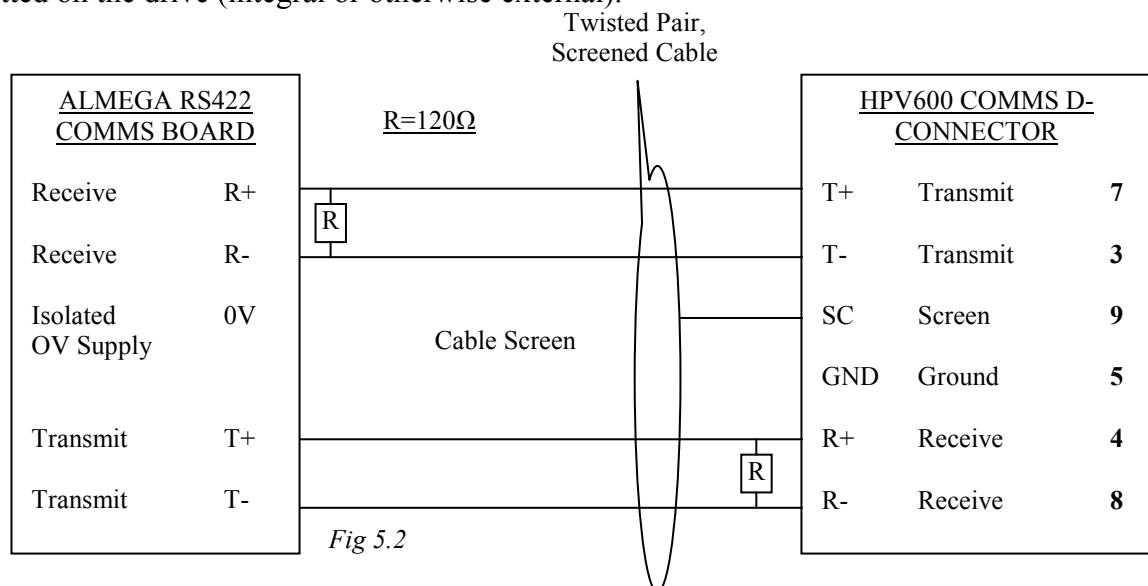
Fig 5.1 below shows an example whereby field bus **terminating resistors** are fitted at the Almega Lift Controller and the Position Device, i.e. LK1 must be closed on the CAN 3 communication board (Almega), and a terminating resistor should be fitted on the position device (integral or otherwise external).



The maximum permitted length of the CAN cable is set at **250M**.

### 5.3) RS422

Similar to the CAN field bus, the RS422 bus, also requires bus **terminator resistors** connected to either end of the field bus. Fig 5.2 below shows the connections to the RS422 serial port, typically for a Magnetek HPV600 Drive RS422 Serial Interface. LK1 must be closed on the RS422 communication board (Almega), and a terminating resistor should be fitted on the drive (integral or otherwise external).



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## 6) Fault Diagnosis

### 6.1) Common Problems

Below is a list of common problems that may be experienced with the positioning system:

- i) Almega LCD shows **PSD CL** in the Lift Viewer screen.  
*This means the lift has lost communications with the Position Device, Check Encoder CANopen connections EH, EL, and E0V. Check terminator resistor configured on the Almega CAN3 board, and the communications wiring away from any noisy wiring. Check Control Panel / Mains supply Earth connections. Change Position Device (i.e. receiver)*
- ii) Almega LCD shows **PSD FL** in the Lift Viewer screen.  
*This means the Position Device communications are ok, but it has a Fault. The fault will mainly be caused by: a learn run has not yet been carried out, a corrupt / loss of position, or the position device floor level parameters (sequence / scale error).*
- iii) Almega LCD shows **PSD EF** in the Lift Viewer screen.  
*This means the Position Device communications are ok, but it has a Fault. The fault is specific to the position device i.e. loss of position (transmitter / receiver problem) or a problem experienced with the communication information.*
- iv) Learning Setup Run Fails  
*See section 9.3 (page25), Learning Run Failures.*
- v) Lift does not stop accurately at floor level, when set for “Direct to floor Control”  
*Ensure drive is set for closed loop.  
Ensure drive parameters are set correctly as per drive specific manual supplement.  
Ensure drive response setting is sufficient.  
Ensure lift is running at the desired speed by measuring with a Tachometer  
Ensure position device parameter “Speed Profile Control” is switched on.  
Ensure position device parameter “Decel Rate” is not too high i.e. try 400mm/s<sup>2</sup>.  
Ensure position device parameter “Decel S Balance” is adequately set i.e. -1.0.  
Ensure position device parameter “Decel Rounding” is sufficient i.e. 1.0  
Ensure lift is not slowing on the slowing limits if inaccurate floor levels are at the terminal floors.  
Ensure position device parameters “Floor Levels” are set correctly.*
- vi) Lift does not stop smoothly, when set for “Direct to floor Control”  
*As not stopping accurately but with the addition of:  
Check the position device parameter “finishing speed” is not set too high.  
Check the position device parameter “finish correction” is not set.*
- vii) Lift does not stop accurately at floor level (NOT Direct to floor Control)  
*Ensure drive parameters are set correctly as per drive specific manual supplement.  
Ensure lift is running at the desired speed by measuring with a Tachometer  
Ensure position device parameters are adequately set “levelling distance  $\geq$  150mm”, “level to zero distance (UP/DN)” 15 - 25mm, and accel / decel rate =450m/s<sup>2</sup> approx.  
Ensure position device parameters “floor levels” are set correctly.*
- viii) Lift intermittently targets a lower speed, and stops at the next available floor  
*Check the fault logger for position device communication errors / position faults.  
Check the fault logger for drive regulator communication errors.  
If communications (to the drive or position device) is lost during travel, the system will decelerate to a lower speed, and stop at the next available floor. It will remain there until communications are re-established. Certain position device faults will also produce the same result.*

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## 6.2) Event History

### Acceleration / Deceleration Events

If a problem occurs during acceleration, or deceleration the micro processor will generate an event, and another event with a code. The code is stored in the “occurrence” part of the event, which are listed below. Events of this kind are only expected under rare circumstances i.e. very poor system response, or very high jerk rates.

POS DEV ACCEL ERR UP	Acceleration Error in the UP Direction
POS DEV ACCEL ERR DN	Acceleration Error in the DN Direction
POS DEV ACCEL ERRCODE	Acceleration Error Code

POS DEV DECEL ERR UP	Deceleration Error in the UP Direction
POS DEV DECEL ERR DN	Deceleration Error in the DN Direction
POS DEV DECEL ERRCODE	Deceleration Error Code

### Acceleration / Deceleration Event Codes

1	= CAPPED_UP	Accel / Decel Limit Capped to Maximum going UP.
2	= CAPPED_DN	Accel / Decel Limit Capped to Maximum going DN.
3	= TARGET_UP	Target distance error UP.
4	= TARGET_DN	Target distance error DN.
5	= VAR0_UP	A critical software variable was 0 in the UP.
6	= VAR0_DN	A critical software variable was 0 in the DN.
49	= OTHER_UP	Error not specified.
50	= OTHER_DN	Error not specified.

### Selector Reset Events

POS DEV SELECTOR RSET	The lift position has been reset by the position device.
POS DEV APOS RESYNC U	The advance pos has been re-synchronised in the UP.
POS DEV APOS RESYNC D	The advance pos has been re-synchronised in the DN.

### Events Relating to Specific Faults

POS DEV FLEV VN STUCK	Door / Floor Level zone not released during run (stuck)
POS DEV POSN RANGE ER	The Position Device absolute position is out of range.
POS DEV POSN SCALE ER	The floor level parameters are not in the correct sequence i.e. scale is in error.
POS DEV EMCY MSG ERR	The Position Device is sending an EMCY fault message.

### Communication Events

Depending upon on the configuration of the position device, speed may also be transferred as well as position.

POS DEV POS COMS REST	Position Device <i>Position</i> Communications Restored
POS DEV POS COMS LOST	Position Device <i>Position</i> Communications Lost
POS DEV SPD COMS REST	Position Device <i>Speed</i> Communications Restored
POS DEV SPD COMS LOST	Position Device <i>Speed</i> Communications Restored
CANOPEN CONFIG WRITTN	The CANopen configuration has been written to the Position Device (i.e. updated, or a command issued to write the configuration, see section 10.4 (page 32)).

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### Learning Run Events

POS DEV LEARN-R START	Learning Run Started
POS DEV LEARN-R COMPL	Learning Run Completed Successfully
POS DEV LEARN-R FAILD	Learning Run Failed, occur = lift position where failed.
POS DEV LEARN-R TIMED	Learning Run Maximum time exceeded.
POS DEV LEARN-R CANCL	Learning Run Cancelled.

### Timeout Events

PROFILE START TMOUT U	The speed profile failed to increase above zero in a specified time (start fail time), in the UP
PROFILE START TMOUT D	The speed profile failed to increase above zero in a specified time (start fail time), in the DN.
POS DEV SLOWP TMOUT U	After a command to slow in the UP, the positioning system has failed to initiate slowdown. (5 program cycles typical).
POS DEV SLOWP TMOUT D	After a command to slow in the DN, the positioning system has failed to initiate slowdown. (5 program cycles typical).

### Events Relating to Software Terminal Limits

UP TERM LIMIT FAILURE	the lift has travelled upwards beyond the programmed position of the Up Terminal Stopping Limit.
DN TERM LIMIT FAILURE	the lift has travelled downwards beyond the programmed position of the Down Terminal Stopping Limit.

## **6.3) Trace Event History**

In the trace setup parameters, there is an option to set position device info to YES. When this is set the following events will be generated in the Event Trace Buffer.

### Floor Levelling Accuracy

The number stored in the “occurrence” part of the event, refers to the out of level distance (in mm).

STOPPED HIGH IN UP	Lift has stopped above floor level in the UP direction.
STOPPED LOW IN UP	Lift has stopped below floor level in the UP direction.
STOPPED HIGH IN DN	Lift has stopped above floor level in the DN direction.
STOPPED LOW IN DN	Lift has stopped below floor level in the DN direction.

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## 7) Parameter Adjustments

### 7.1) Parameter List

- **Travel Speed Adjustments**
  - Drive Contract Speed
  - Drive High Speed
  - Drive Medium Speeds
  - Drive Level Speed
  - Profile Finish Speed
  - Learning Run Speed
- **Floor Speed Parameters**
- **Control Adjustments**
  - Position Device Fitted
  - Speed Profile Control
  - Floor Levels
  - Overrun top
  - Overrun Bottom
  - Reset Floor
  - Within Floor Level Distance
  - Out of Level recovery
  - Allow Reset on Limits
  - Clear calls when Selector Reset
  - Position Reset Attempts (in General Parameters)
  - Ignore Slowing Limits on Learn
  - Software Terminal Limits
  - Up Terminal Limit Distance
  - Down Terminal Limit Distance
- **Speed Profile Adjustments (without Direct To Floor)**
  - Acceleration Rate
  - Deceleration Rate
  - Level Distance
  - Level to zero distance UP
  - Level to zero distance DN
- **Speed Profile Adjustments (with Direct To Floor)**
  - Acceleration*
    - Acceleration Rate
    - Acceleration 'S' Rounding
    - Acceleration 'S' Balance
    - Acceleration Advance Distance Threshold
    - Acceleration Advance Distance Inertia Rate
  - Deceleration*
    - Deceleration Rate
    - Deceleration 'S' Rounding
    - Deceleration 'S' Balance
  - Other*
    - Minimum Time on High Speed
  - Special Deceleration Adjustments*
    - Finish Correction
    - Finish Distance
    - Deceleration Advance Tracking Distance

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## 7.2) Travel Parameters Speed Adjustments

These parameters are not part of the positioning system parameter block, but are instead found in Travel Setup. They provide the positioning system information needed to generate speed profiles, and specific desired speeds. In general they should be setup before any adjustments to the speed profiles are carried out, ensuring the lift actually travels at the target speeds (using a tachometer or otherwise). Fine adjustments in association with setting up the speed profiles may then be made.

### Drive Contract Speed

This parameter provides the positioning system with the maximum speed achievable for the lift system. The parameter may also program the drive contract speed parameter when the serial link is available (i.e. Magnetek drives).

### Drive High Speed (see also floor speed parameters)

This parameter provides the positioning system with the value for High speed. When speed profile control is enabled (direct to floor), the positioning system profile generator uses this value as the maximum target speed achievable, for a floor to floor travel. If this speed cannot be achieved the profile generator calculates a suitable lower speed, and hence profile.

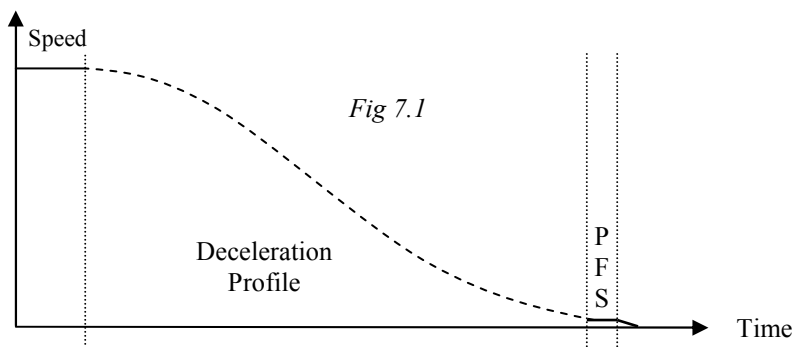
### Drive Medium Speeds / Drive Level Speed (see also floor speed parameters)

These parameters provide the positioning system with the values for Medium speeds.

When speed profile control is enabled (direct to floor), the positioning system profile generator may use these values to target a desired speed for a specific floor to floor travel. Under most circumstances the floor speed parameters will be set to high speed which means the positioning system determines the maximum speed. However this speed can be overridden using a medium speed.

### Profile Finish Speed

When speed profile control is enabled (direct to floor), the profile finish speed (PFS) is used to provide the absolute finishing speed of the speed profile, the generated profile cannot drop below this speed. This speed will only be applied for the last few mm of travel. A setting of zero could result in the lift stopping slightly short of floor level. A typical setting for this parameter is **2mm/s**.



### Learning Run Speed

This is the speed the lift will travel at during a learning run of the shaft. If the speed is set too high errors may occur learning the data. A typical setting for this is **0.2m/s**, with a maximum setting of **0.5m/s**.

## 7.3) Floor Speed Parameters

When speed profile control is enabled (direct to floor) it is recommended that all floor to floor run speeds should be set to high speed. This allows the positioning system to automatically generate a suitable speed / profile for the distance to travel. However the profile generator may be given a user defined speed by setting a medium / level speed. The floor speed parameters indicate the selected speed for the floor to floor travel; the speed settings determine the speed.

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## 7.4) S-Curve Selection

The Positioning System, where possible will utilize different s-curve sets for different Controls. The s-curve sets which may be accessible when used with an inverter drive; provide specific properties regarding acceleration and deceleration for differing situations as detailed below. Where the s-curve sets are not accessible (e.g. Hydraulic System) the system can only operate within the single acceleration / deceleration settings of the system. Please refer to specific drive system (manual) to determine whether these s-curve sets are available.

For a drive providing a typical set of 4 s-curves, each would be utilised providing settings for Acceleration / Decelerations as below:

- Set 0 = Inspection Control / Learning Run Control / Re-levelling Control. (*See Also Note*)
- Set 1 = Lift Controller Speed Profile Operation (Normal Operation).
- Set 2 = Spare
- Set 3 = Emergency Operation (quick slowdown).

*Note: where Speed Profile Control is NOT available (i.e. switched off) S-Curve Set 0 will be used on Normal operation instead of Set 2.*

### Inspection Control / Learning Run Control / Re-levelling Control.

Under this control the drive generates the s-curves. The Lift controller issues the speed command, but the drive uses its internal ramp generators to produce the s-curve according to the s-curve settings (acceleration / deceleration etc) of set 0.

### Speed Profile Operation

Under this control the lift controller generates the s-curves. The Lift controller issues the speed commands in the form of s-curves according to the s-curve settings within the lift controller. Under this control the drive will have its settings (set 1) for acceleration and deceleration turned to maximum, or switched off.

### Emergency Operation

Under this control the drive generates the s-curves. The Lift controller issues the speed command, but the drive uses its internal ramp generators to produce the s-curve according to the s-curve settings (acceleration / deceleration etc) of set 3. The settings for acceleration will be typically high, up to a maximum of 1.5m/s<sup>2</sup>. The use for this set is restricted to emergency slowdown only, i.e. Communications lost; or the lift has reached a slowdown check point, or there are errors within the positioning system etc.

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## 7.5) Control Parameter Adjustments

### Position Device Fitted

This parameter acts as a software switch to determine whether or not a Position Device is fitted. If one is fitted, and is available for direct communication, the Parameter should be set for YES. If one is not fitted i.e. a “Tape-head” is fitted instead, this parameter should be set to NO.

### Speed Profile Control

This parameter enables the software to control the speed profile from the Almaga processor. Setting this to YES means the Almaga will generate s-curves, and determine the speed of the lift floor to floor runs. This is effectively “Direct to Floor” control.

Setting this to NO means the Almaga will still control some of the profile since it will be able to determine slowing / stepping points, however the s-curves are generated by the drive system (Traction or Hydraulic). This is NOT “Direct to Floor” control, since a level speed is required.

### Floor Levels

The lift floor level values are stored as distances (in mm). Adjustment of floor levels may also be made (in mm). Incrementing the floor level value may adjust the lift to stop higher, however it is dependent on the position device setup. The position device may produce either an Ascending or Descending position, depending upon how it is setup / installed. A typical position Device with the transmitter on the lift car, and receiver at the top of the lift shaft will naturally produce a Descending lift position scale, since the distance will increase as the lift goes down. In that case, making the lift stop higher requires a decrease in floor level position.

### Overrun Top / Bottom

The positioning system determines the lift position (i.e. 1 to number of floors) using the absolute position of the position device, and by comparing a distance range above and below the actual floor stopping level. Since the lift may over-travel at the top / bottom, a certain amount of value for overrun is required, to allow for the software to scan the top / bottom position ranges. Overrun Top should be set to a value greater than the maximum overrun the lift can travel (at the top), and less than the overrun to the absolute top position. Overrun Bottom should be set to a value greater than the maximum overrun the lift can travel (at the bottom), and less than the overrun to the absolute bottom position.

### Reset Floor

Under conditions where the lift has stopped out of floor level, i.e. Power Up, and switched from Inspection to Normal control etc, a reset floor may be specified. The lift will travel to this reset floor on a suitable speed (programmed or automatically determined i.e. “Dive Speed”). If the reset floor is set to 0, the nearest floor will be selected for a reset.

### Within Floor Level Distance

If the lift stops within the distance (above or below floor level) set by this parameter, the lift is deemed to be within floor level. However otherwise, the lift is deemed to be out of floor level. An event will be generated in the fault logger, and the doors will not open automatically (however door open push remains operative). A further option is to allow the lift to re-level back to floor level, to compensate for the out of level distance (i.e. rope stretch, or over / under shoot). A typical setting for this parameter is **6mm**.

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### Out of Level Recovery

The out of level recovery provides a method of returning the lift to floor level, if it does not stop within floor level. In general this occurrence should be rare and only due to excessive loads within the lift car, or poor system response / poor system setup. Recovery is invoked if the lift stops out of the “within floor level distance” (typically 6mm). Firstly the lift will not open its doors, and therefore the doors have to be closed to recover. Secondly the lift will disregard its current lift position and establish a system call (homing call) to the “reset floor” as specified. A reset floor of 0 indicates the nearest floor. The lift will then move on reduced speed to the reset floor. If the lift stops within floor level, then a position reset is established, and the doors will open. However if it does not, further attempts will be made. The number of attempts is limited by the parameter “Position Reset Attempts” in General Parameters. If the number of attempts is exceeded, and the lift still has not reset to the desired floor position, then the selector is reset to the nearest position, but the lift will remain out of floor level until a new call is established. On installations where re-levelling is installed, this feature will be disabled.

### Allow Reset on Limits

Allow reset on limits option, allows the lift position to be reset on the reset shaft limit switches, as traditionally implemented. Under most circumstances it is expected that this option is switched off, and the positioning system is used to reset the position. However users may prefer the traditional method.

### Clear Calls When Selector Reset (Clear calls on Reset)

This parameter allows the user to select whether; all calls within the system are cleared when a selector is reset is established. Setting the parameter to Yes will clear the calls.

### Position Reset Attempts

This parameter found in General Parameters indicates the number of attempts that will be carried out to reset the lift position, when the lift position is not established. This usually occurs upon switch on, or after switching from Inspection Control to Normal operation. The position is reset when the lift stops within floor level. If the number of attempts has been exceeded the lift resets to the nearest position. Also when out of level recovery is switched on, this parameter determines the number of position reset attempts, to reset within floor level.

### Ignore Slowing Limits on Learn

This parameter allows the user to select whether the lift targets level speed when the slowing limit is reached during a shaft learning run. Setting the parameter to Yes will instruct the lift program to ignore the slowing limit on a learning run, thus learn run speed is selected. This can help speed up a learning run due to excess levelling at the terminal floors.

### Software Terminal Limits

This parameter allows the user to select whether software terminal limits are utilised within the software, rather than shaft limit switches. Setting the parameter to Yes will instruct the lift program to stop the lift when it passes the programmed position of the terminal limits. This is directional e.g. when it passes the Up Terminal Limit in the UP direction, and the Down Terminal Limit in the DN direction.

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### Up Terminal Limit Distance

This parameter sets the position of the Up Terminal Limit to a distance above the top floor level position. Setting of the Terminal Limits may be manual (i.e. from the keypad) or automatic (i.e. during a learn run). The terminal limits are set / reset each time a change is made to the Position Device parameter block. Simply changing the distance will update the terminal limit position.

### Down Terminal Limit Distance

This parameter sets the position of the Down Terminal Limit to a distance below the bottom floor level position. Setting of the Terminal Limits may be manual (i.e. from the keypad) or automatic (i.e. during a learn run). The terminal limits are set / reset each time a change is made to the Position Device parameter block. Simply changing the distance will update the terminal limit position.

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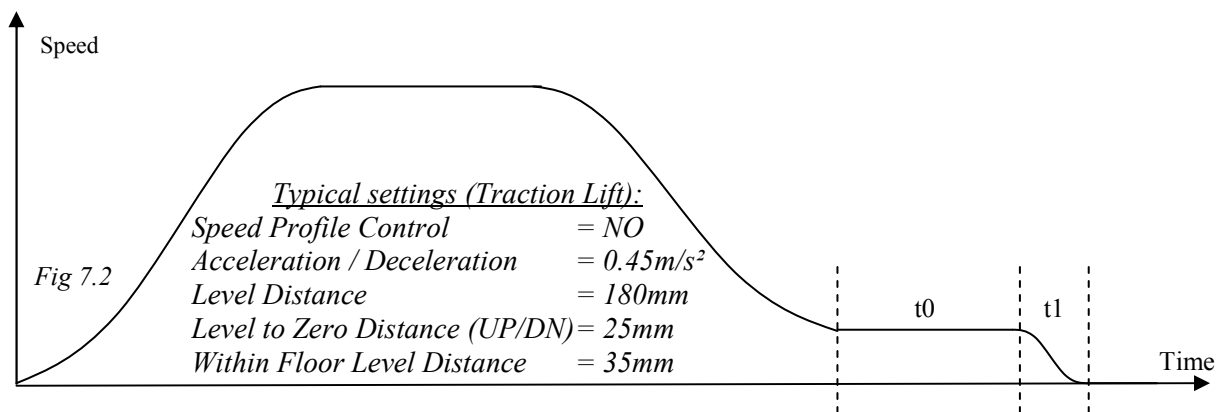


## 7.6) Speed Profile Adjustments Without Direct to Floor Control

### Typical Profile Setup

A typical profile setup is as Fig 7.2 below. The profile shows the s-curves generated by the Drive. The adjustments for acceleration and deceleration are carried out within the drive unit. Adjustments for acceleration and deceleration within the Almega, are only necessary so that they match (as best as possible) the actual settings of the drive. This ensures that the positioning system can calculate slowing / stepping distances accurately to match the profile of the lift.

Since the system does not have the Direct to Floor approach, time has to be allowed for levelling speed; and from levelling speed to zero speed as shown by t0 and t1 respectively below. These times are adjusted by adjusting the distances: Level Distance and Level to Zero Distances (UP/DN).



### Acceleration / Deceleration Rate

As previously stated, adjustments for acceleration and deceleration within the Almega, are only necessary so that they match (as best as possible) the actual settings of the drive. These rates will be different for Traction and Hydraulic systems, since Hydraulic systems in general are not as fast as traction, and they tend to be less responsive.

For a traction lift controller, setting the rates between **0.4 and 0.6m/s<sup>2</sup>** would suffice in most applications. In the case of a Hydraulic Lift the acceleration / deceleration will not usually be known, but will probably range between (0.2 and 0.6 m/s<sup>2</sup>). A typical figure would be between 0.3 and 0.5 m/s<sup>2</sup>. Therefore setting them at **0.4m/s<sup>2</sup>** would suffice in most applications.

### Level Distance

Levelling Distance can be calculated using the levelling speed of the lift, and the time required for the lift to travel on levelling speed. A Typical time for levelling speed would be between 2 and 3 seconds. A Typical Level speed would be about 0.6m/s (60mm/s).

$$\begin{aligned} \text{Level Distance} &= \text{Level Time (2.5)} * \text{Level Speed (60)} \\ &= 150\text{mm}. \end{aligned}$$

### Level to Zero Distance UP / DN

This is the distance required for the lift to decelerate from level speed to zero speed, and stop at floor level. Typical settings would range between 15 and 30mm.

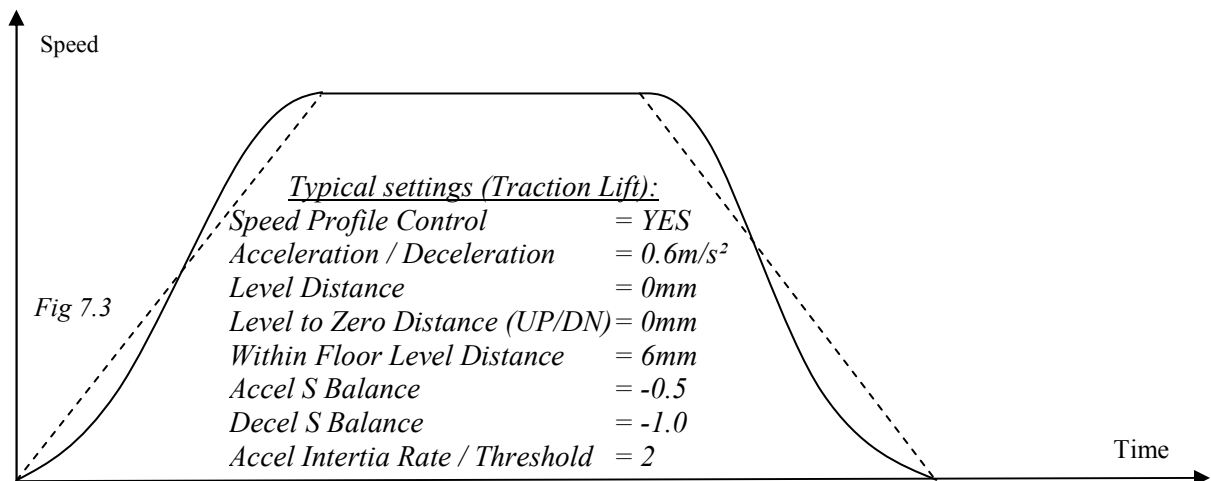
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## 7.7) Speed Profile Adjustments With Direct to Floor Control

Direct to Floor Control is achieved when the Lift control system is able to control the speed of the Drive system by applying the speed profile. This is usually implemented using a serial communication control link. Refer to the specific drive supplement for details of serial communication control.

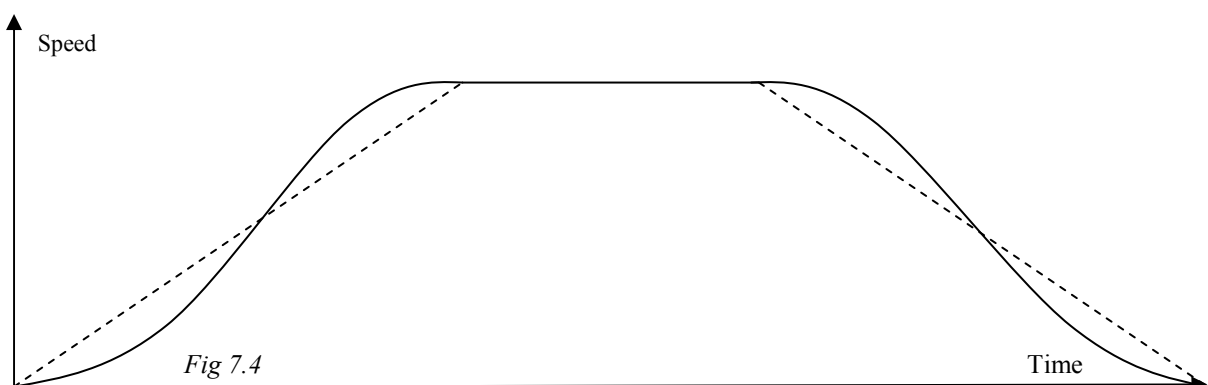
### Typical Profile Setup (e.g. 600mm/s<sup>2</sup>, 0.6m/s<sup>2</sup>)

A typical profile setup is as Fig 7.3 below. The profile acceleration / deceleration set at 0.6m/s<sup>2</sup> will suit most lift applications. The profile has the rounding set to maximum. The 'S' balance is set as shown. The minimum time on High speed is set to 1S to allow a flat top duration on medium speeds. These settings are the default settings, and most of the time will need very little adjustment. The dashed line represents uniform acceleration / deceleration (in all diagrams).



### Acceleration / Deceleration Rate (Low Setting e.g. 250mm/s<sup>2</sup>, 0.25m/s<sup>2</sup>)

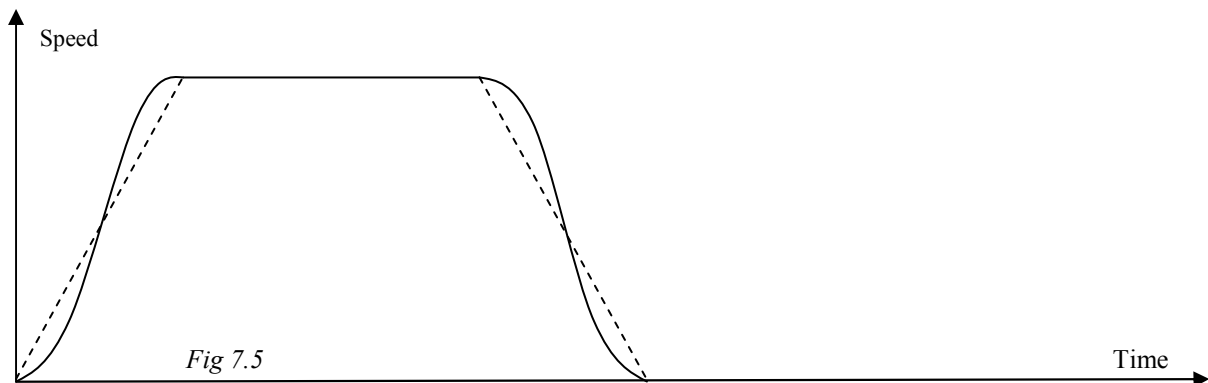
Decreasing the Acceleration / Deceleration rate, adjusts the jerk when starting and finishing a lift journey. The result is a smoother / less jerky ride. However the lower these rates are, the longer the floor to floor travel times will be.



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### Acceleration / Deceleration Rate (High Setting e.g. 1000mm/s<sup>2</sup>, 1m/s<sup>2</sup>)

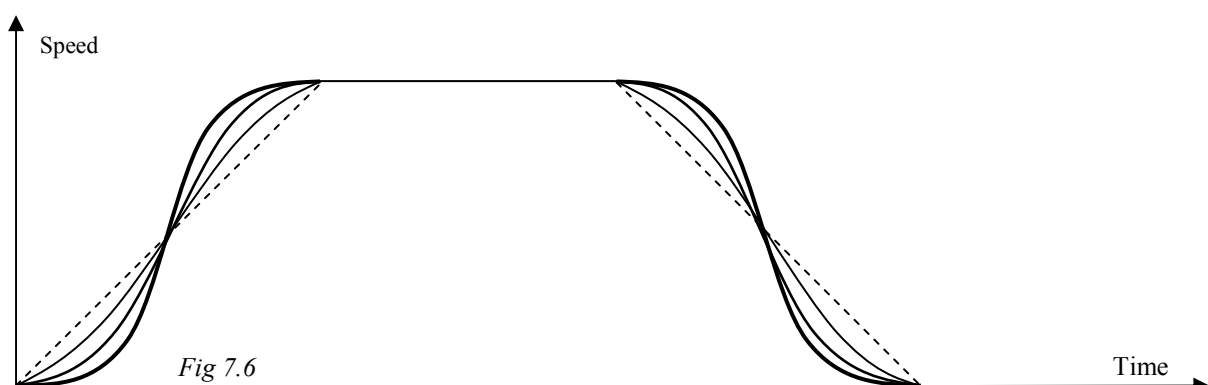
Increasing the Acceleration / Deceleration rate, adjusts the jerk when starting and finishing a lift journey. The result is a “harsher” ride with more jerk(s). However the higher these rates are set, the shorter the floor to floor travel times will be.



### Acceleration / Deceleration Rounding

The rounding of the ‘S’ curve can be adjusted (if necessary). The s-curve requires rounding to reduce the jerk, and hence vibration when changing from a constant speed value to a varying ramp speed (i.e. at the start and end of the ‘S’). As a rule the more rounding, the smoother is the transition of a change in speed. However the rounding effect applies an increase in “peak acceleration / deceleration”. E.g. for given acceleration of say 0.6m/s<sup>2</sup>, the peak acceleration may be up to 1.3 times (0.78m/s<sup>2</sup>) when the rounding is set to full, the average however remains at 0.6 m/s<sup>2</sup> throughout the acceleration period. If the peak value is not desirable, it may be better to reduce the overall acceleration / deceleration rate, rather than decrease the rounding, since too little rounding may cause vibrations.

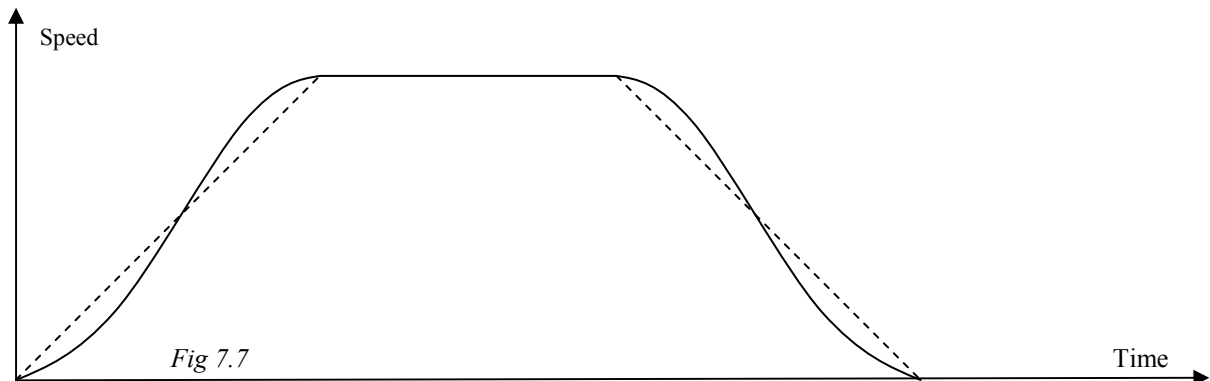
Fig 7.6 below shows 3 examples of rounding. The outer s-curve has the most rounding, whilst the inner s-curve has the minimum. If the rounding it turned to zero, the result will be a straight line (i.e. uniform acceleration / deceleration, as the “dashed line”).



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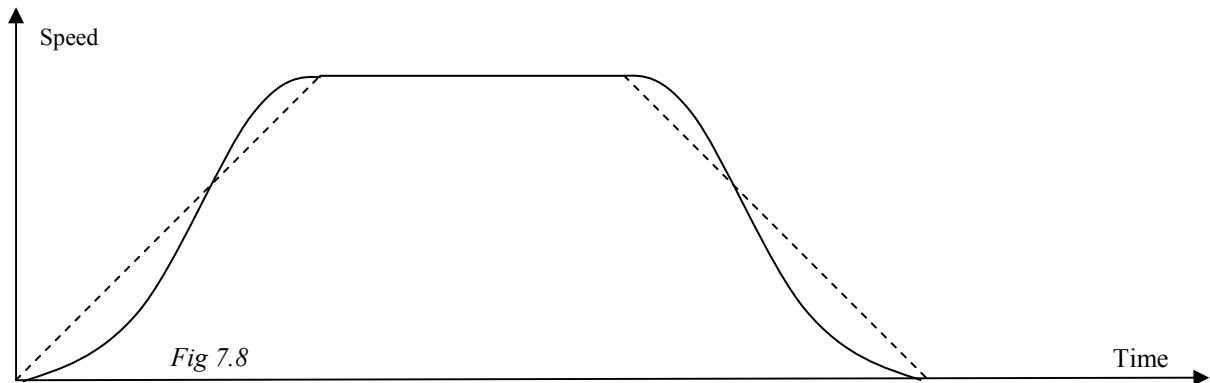
### Acceleration / Deceleration S-Balance (Setting = 0)

The balance of the s-curve can be adjusted (if necessary). This is similar to adjusting the “s-curve in”, and “s-curve out”, as compared with some motor drives. The main purpose is to allow adjustment of the rounding at the start and end of the s-curve. If the balance is set to the middle (0), the rounding is equal at the start, and end of the s-curve as shown in Fig 7.7.



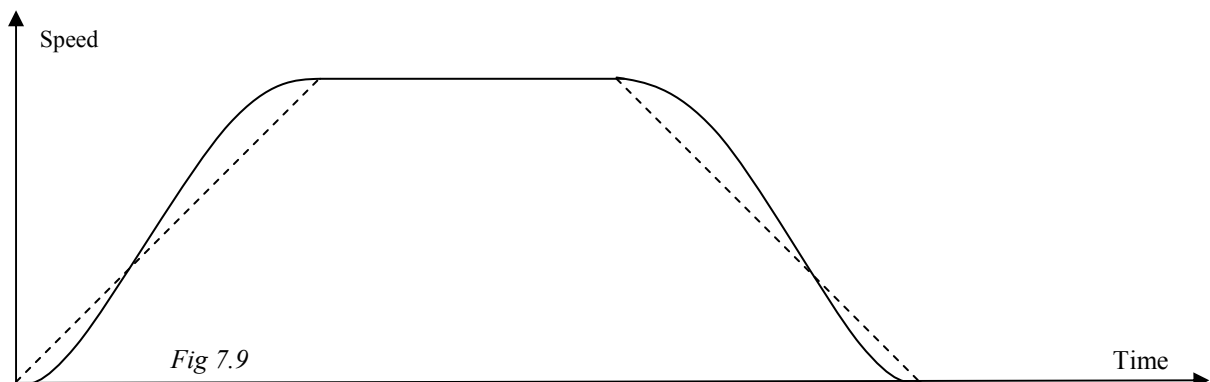
### Acceleration / Deceleration S-Balance (Low setting e.g. -2)

If the balance is set low for acceleration and deceleration, the rounding is greater at the low end, towards zero speed (i.e. at the start of the acceleration phase, and at the end of the deceleration phase as shown in Fig 7.8). Adjustments may be carried out to reduce vibrations or ride quality at the low end (i.e. setting off and stopping).



### Acceleration / Deceleration S-Balance (High Setting e.g. +2)

If the balance is set high for acceleration and deceleration, the rounding is greater at the high end, towards the target speed (i.e. at the end of the acceleration phase, and at the start of the deceleration phase as shown in Fig 7.9). Adjustments may be carried out to reduce vibrations or ride quality at the high end (i.e. approaching high speed, and decelerating from high speed).

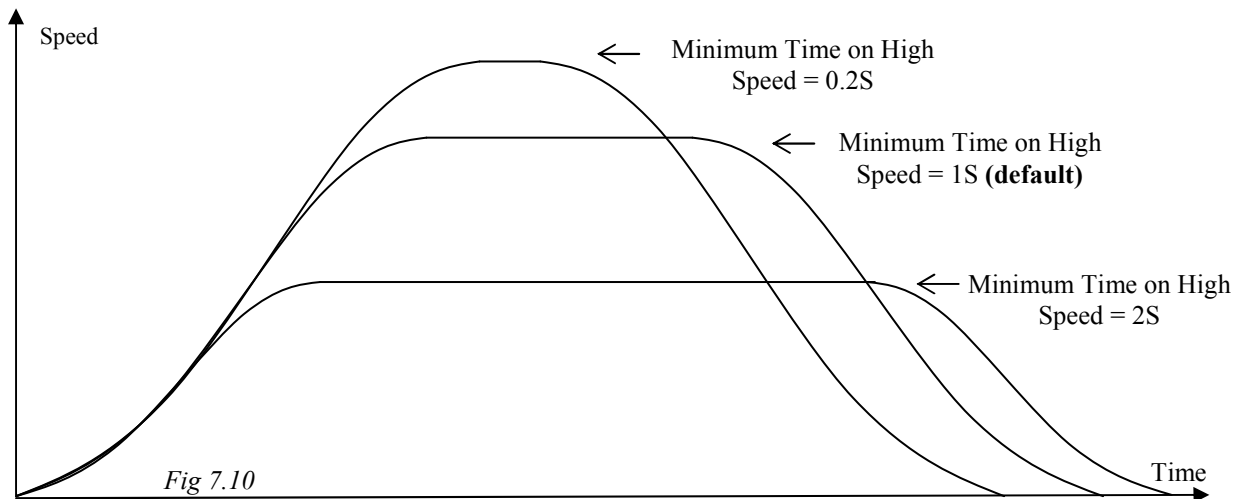


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### Minimum Time on High Speed

The minimum time on High Speed setting applies a “flat top” to the speed profile for lift journeys. This time allows for the speed profile to settle on High Speed, thus improving the ride quality. On a high Speed, multi floor run, this usually does not apply since the Lift is on High speed for a long period of time, due to the distance. Therefore minimum time on high speed mainly applies to floor to floor journeys where high speed cannot be reached.

The smaller the time, the higher the lift target speed will be, however the ride within the lift car may feel unsettled, if too small. The larger the time, the lower the lift target speed will be, also the floor to floor travel time will be longer. Below shows 3 examples, the default value 1S, a longer time of 2S, and a short time of 0.2S.



### Acceleration Advance Distance Threshold

The advance distance threshold is used to set the starting point of the speed profile.

When this parameter is set to zero, the profile start speed with be 0. If roll back occurs, setting a slight offset with this parameter, will apply a start speed of just above zero. A typical setting for this parameter is **2mm**.

### Acceleration Advance Distance Inertia Rate

The advance distance inertia rate is required to ensure the lift follows the acceleration profile, and sets off without excess delays. Comparing acceleration to deceleration, there is a natural inertia force during deceleration which effectively tries to maintain the last speed and hence advances the distance remaining. During acceleration this force does not exist at the beginning since the lift has no speed. Therefore a false inertia rate is applied to start the lift moving. This parameter ranges from a value of 1-10 (10-100mm/s). A typical setting for this parameter is **2 (12.5mm/s)**.

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## 7.7.1) Special Direct to Floor Control Adjustments

The parameters below may be used under special circumstances to generate a different finish profile other than the standard s-curve. The main difference is the finish profile generated by these parameters, is added to the normal s-curve during the finish distance period. This profile takes a different shape to the normal s-curve so that the approach is more gradual which should give a better controlled stop. However sudden changes in profile may result in excess jerk or vibrations. **It is very unlikely that a system using closed loop motor speed control; will use any of these parameters. The system should be configured using the standard parameters as described in the previous section. Setting of the parameters below should only be used in special circumstances, and it would be beneficial to seek advice from Lester Control Systems before using these.**

To disable the parameters set as below:

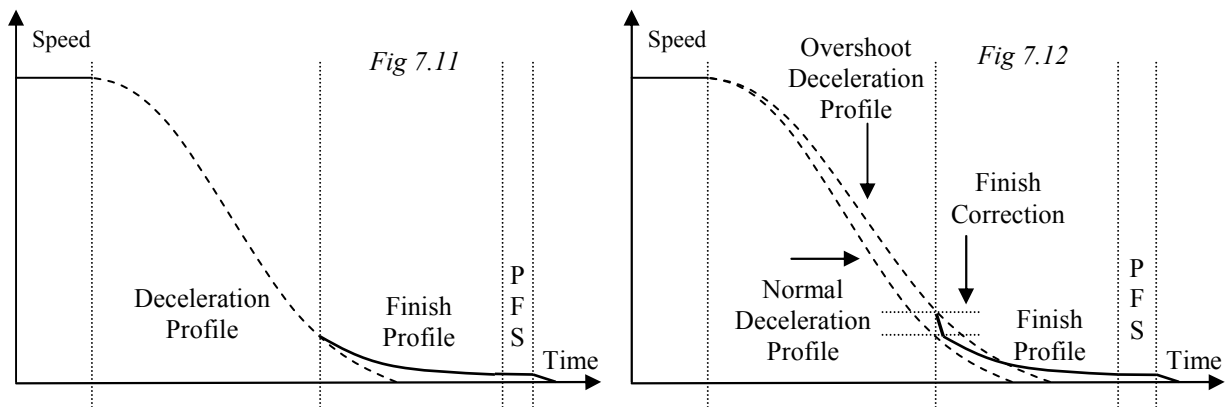
Finish Correction	= NO
Finish Distance	= 0
Deceleration Advance tracking Distance	= 0

### Finish Distance and Finish Correction

Finishing distance refers to the very last part of the deceleration speed profile before stopping (as shown in fig 7.11). The positioning system generates a softer ramp when the distance remaining is equal to or less than the finish distance. This ensures a gentle stop of the lift. A typical value for this parameter is **15mm**.

Finish correction is available if required (as shown in fig 7.12). Setting this parameter to YES will allow correction of overshoot as shown below. Under this condition the finish profile is forced to a pre-defined pattern to attempt to stop the lift accurately at floor level. The increase in jerk may be felt from within the lift car; however its use is restricted below a certain speed. With correct installation and setup it is anticipated that correction should not be required.

*PFS below refers to profile finish speed (see Travel Speed Adjustments (page 11))*



### Deceleration Advance Tracking Distance

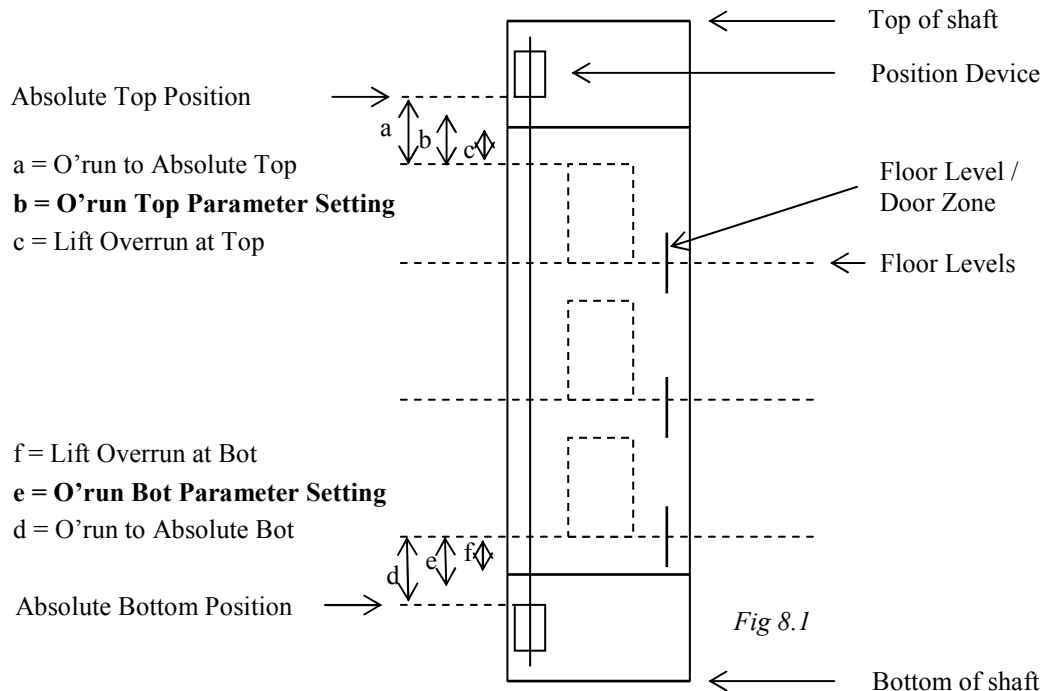
The positioning system applies a deceleration profile that is calculated to take the lift directly to the floor position. The profile is checked and corrected periodically “tracked” so that the speed applied for the distance remaining is as the desired profile. Applying an advance distance means that the profile will effectively finish before floor level is reached. This allows compensation for any overshoot. The advance tracking distance and finish distance work together to provide the finishing profile. As a general rule the finish distance should be greater than the tracking distance. Typical values for both are finish distance is **15mm**, and advance tracking distance is **5mm**.

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## 8) Positioning System Floor Level Setup

Before either of the methods below are carried out, the Overruns at the Top and Bottom of the lift shaft have to be determined, and entered as parameters.

Overrun Top should be set to a value greater than the maximum overrun the lift can travel (at the top), and less than the overrun to the absolute top position. Overrun Bottom should be set to a value greater than the maximum overrun the lift can travel (at the bottom), and less than the overrun to the absolute bottom position. The diagram below (Fig 8.1) shows the overruns.



### 8.1) Manual Floor Level Setup

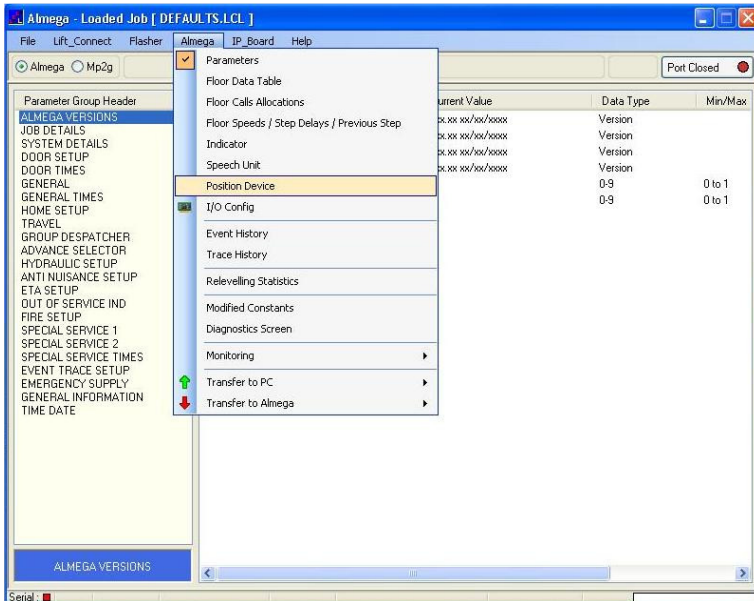
The floor level parameters may be set manually (if desired). If the absolute positions of the floor levels have been determined (either on inspection, or otherwise), they may be entered into the micro processor as parameters (see windows application software setup and keypad interface).

### 8.2) Automatic Floor Level Setup “Learning Run”

The floor level parameters may be determined automatically (if desired). These values are established via the use of a learning run (see windows application software setup and keypad interface).

The lift travels from the bottom position to the top position, and back again on reduced speed. As the lift travels past the floor level / door zone vanes, a position reading is recorded. Hopefully little or no adjustment to the floor levels will be carried out, to complete the setting of the floor levels.

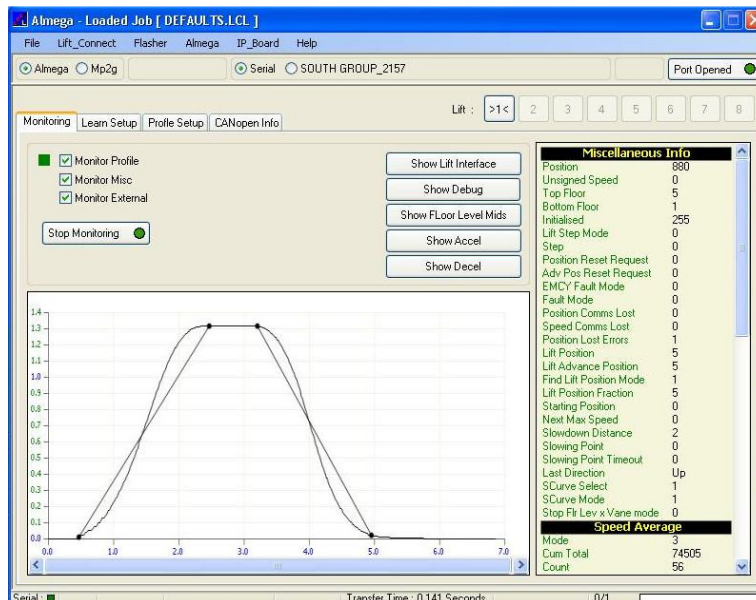
## 9) LcsIWin PC Software



The Windows application software provides an excellent user / diagnostic interface for the positioning system. Parameter settings, speed profile / floor level adjustments, monitoring, and diagnostics are all accessible. The software will work on any IBM compatible P.C. or laptop (250MHz or higher) with windows version XP, or Vista.

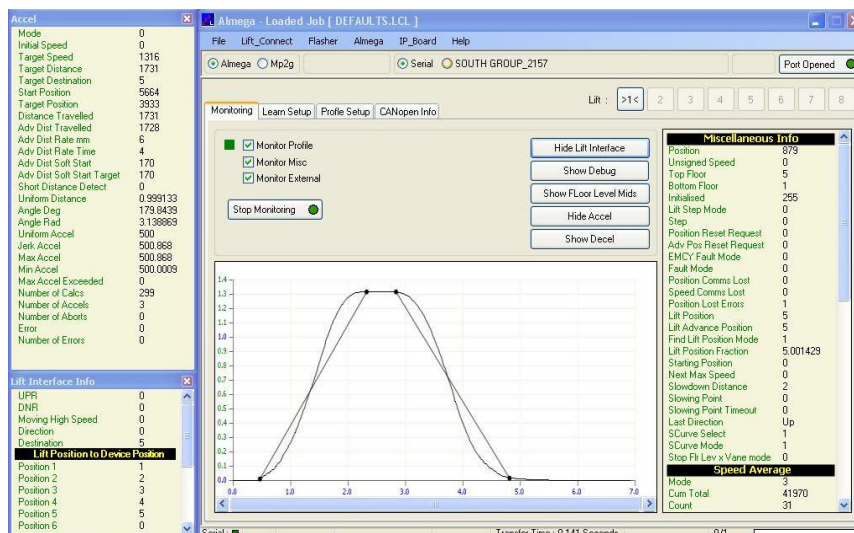
To select the Position Device, setup and monitoring, click Almega->Position Device (as shown).

### 9.1) Monitoring



The Position Device selection consists of 4 further options (Monitoring, Learn / Profile setup, and CANopen info) as indicated by the tabs (as shown).

In monitoring further options may be selected by the "tick" boxes. The speed profile will usually be the main option, and when selected a speed profile will be drawn as the lift travels. The window may also be "floated" as a separate window by "double clicking" the mouse within the profile area.



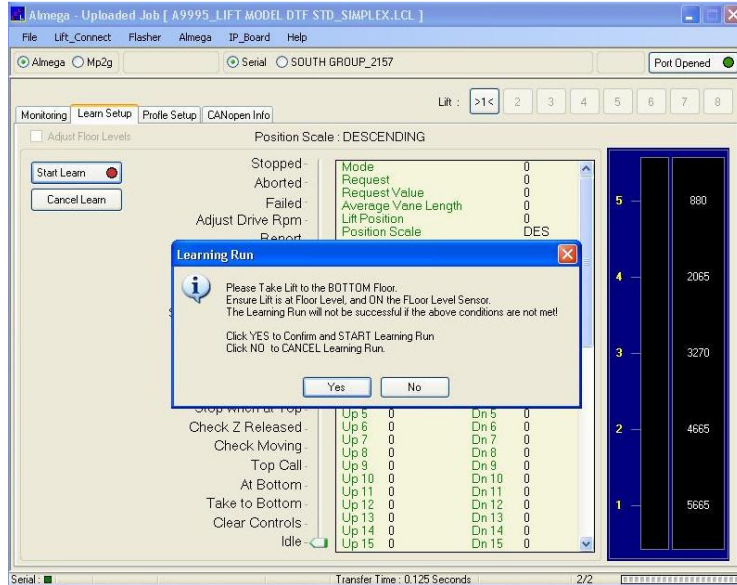
The buttons on the screen also allow other windows to be shown. Within these windows there is debug information of the lift positioning system. E.g. Acceleration, Deceleration, Lift interface, and more.

These additional windows will "float" within the main desktop screen. They may be positioned manually as desired.

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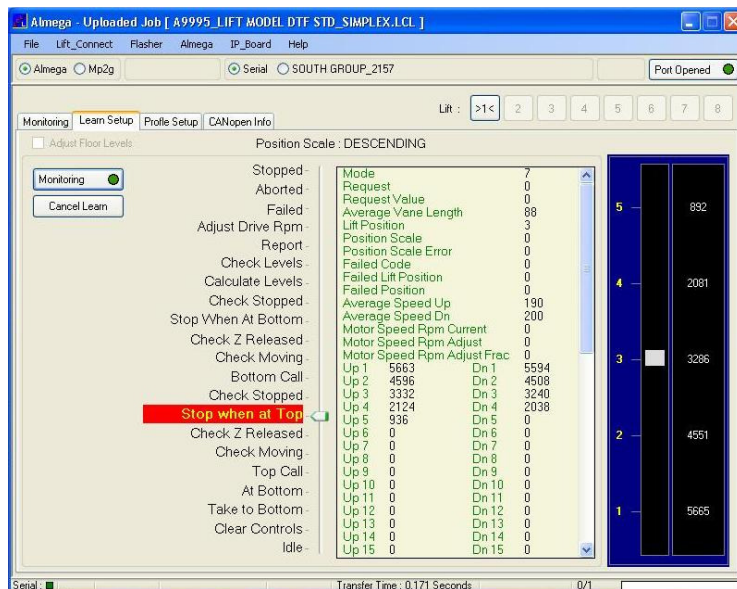


## 9.2) Learning Setup



The software can be used to invoke a “learning run” for the positioning system. The learning run starts with the lift at the bottom floor, and runs from the bottom to the top and back again on reduced speed. Floor level information is gathered whilst the lift passes each floor level / door zone sensor.

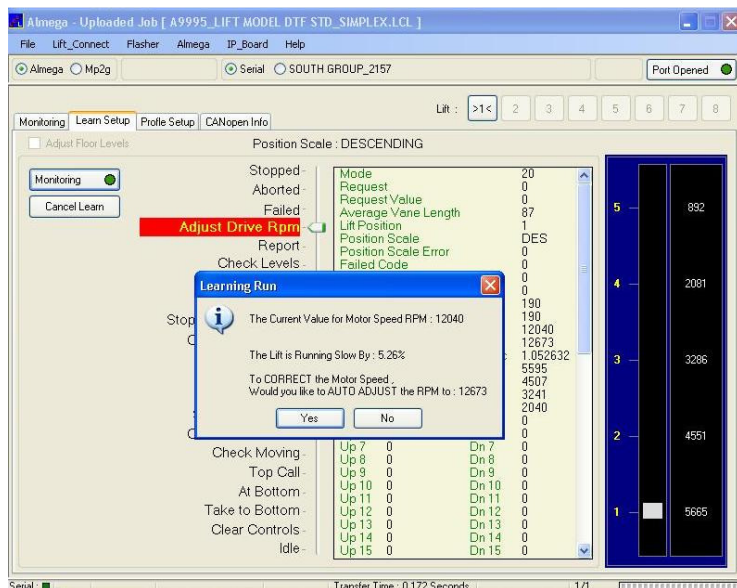
**The lift has to start at the bottom and be stationary**, so when the button “Start Learn” is selected, a message appears to ensure the user is aware (also a “Lift Busy” message will appear if the lift is already moving.) Once confirmation is given the lift starts the run.



When the learn run has started, progress is indicated by the red marker (as shown). The run goes through various states in a pre-defined order to complete the run.

If the run passes, a message box will be shown to indicate success.

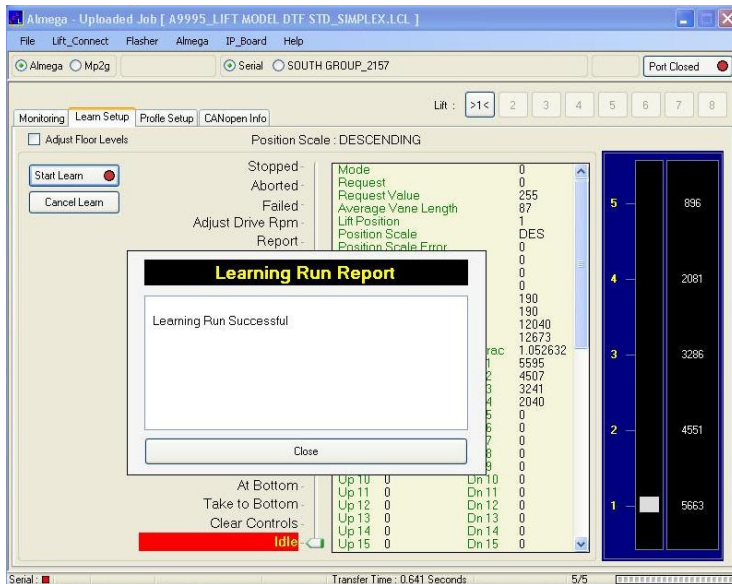
However if the run fails, a message box will be shown detailing the fault. Also the variables within the window help with the diagnosis “Position Scale Error”, “Failed Code”, and “Failed Position”.



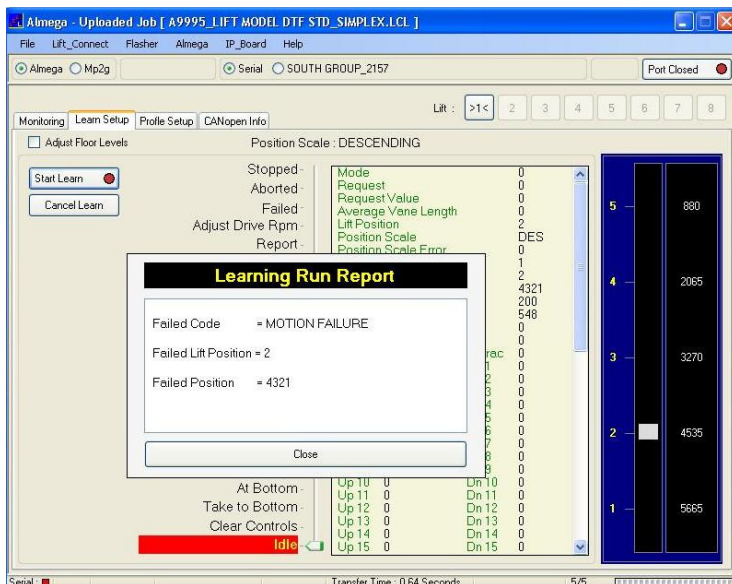
During the learn run, the actual lift speed is monitored against the target speed. If there is a difference an option box will appear to adjust the motor RPM. The user can select YES to automatically adjust, or NO to leave it as it is.

For the positioning system it is very important that the lift does run at the target speed. During the learn run this is checked and corrected by adjusting the relevant parameter within the motor drive.

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Finally when the Learning Run is successful, the Report window reports the Success.



If the Learning Run is NOT successful, the Report window reports the Failure.

The lift and absolute position are recorded at the time of the failure. Failures may be due to the following reasons:

- Aborted:
- Motion Failure:
- Not On Vane Bottom Error:
- Not On Vane Top Error:
- Scale Error:
- Vane Length Error:

### 9.3) Learning Run Failures

**Aborted:** During a Learning run, a cancel was issued, or the emergency stop has been depressed, or the lift has been switched to a special service i.e. Fire or Priority Service etc.

**Motion Failure:** During a Learning run, the RUN input to the micro processor has been interrupted. This may be due to stopping on a terminal limit, or a drive fault, or an interruption to the direction circuit i.e. UP / DN relays.

**Not On Vane Bottom Error:** During the start of the learn run, the lift must start on the bottom floor level / door zone, if not, an error will be reported.

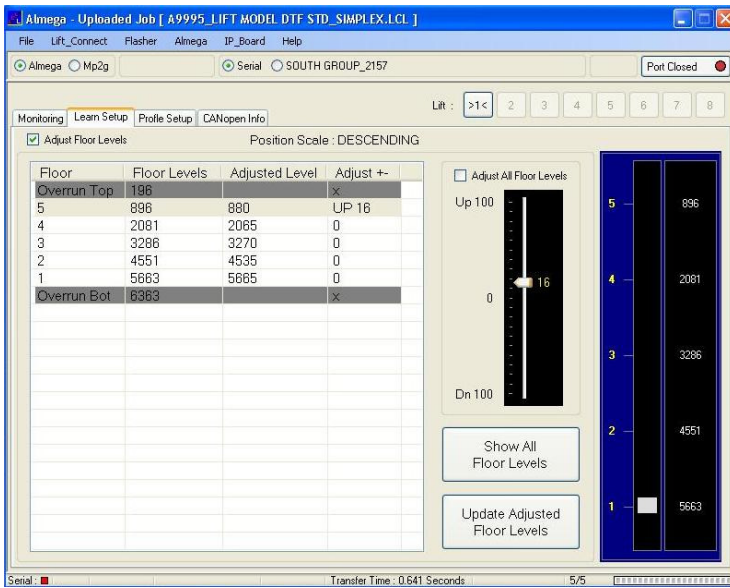
**Not On Vane Top Error:** During the process of the learn run, the lift must stop at the top, and on the top floor level / door zone, if not, an error will be reported. The learning run speed is probably too fast.

**Scale Error:** After completion of the learning run, the floor level parameters are checked and have found to be in an incorrect sequence i.e. the scale is in error.

**Vane Length Error:** After completion of the learning run, the length floor level / door zones are checked, and one or more has been found to be excessive in length i.e. greater than 400mm.

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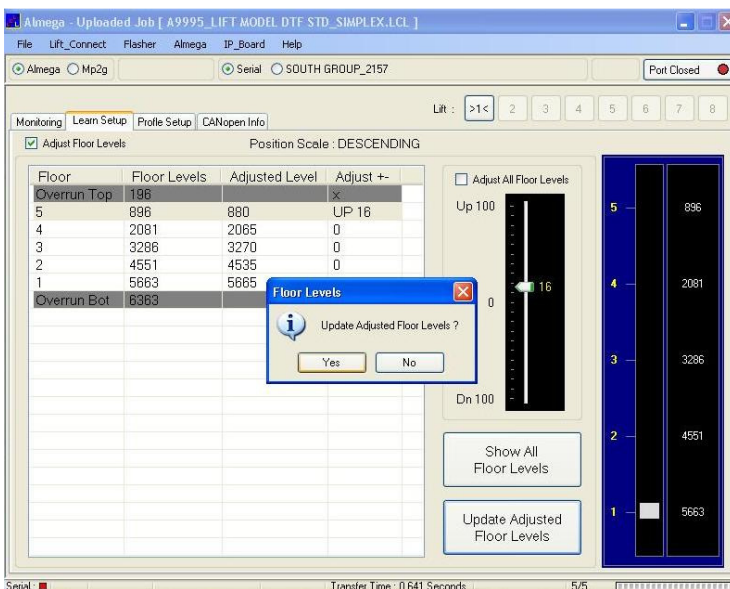
## 9.4) Adjust Floor Levels



Within the Learn Setup tab option, there is a “tick” box “Adjust Floor Levels” which when ticked, allows the user to adjust floor levels.

Floor levels may be adjusted by either typing into the floor position within the column “Adjusted Level” or by selecting the floor position and using the slide bar.

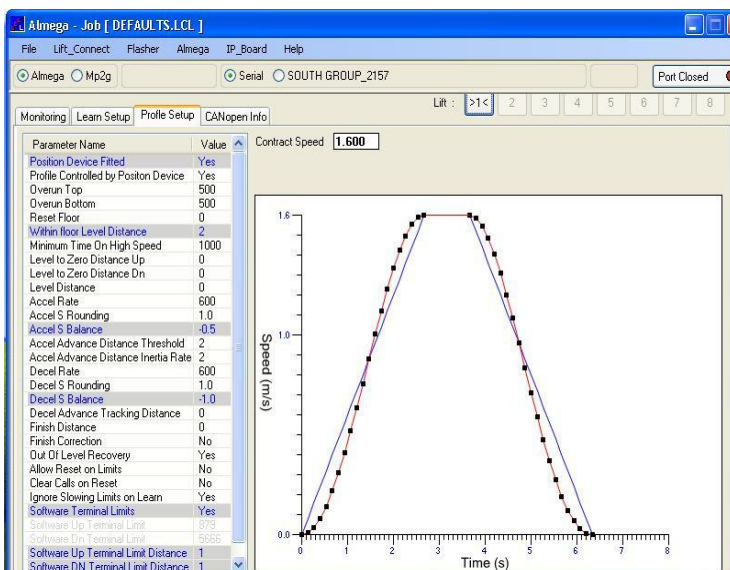
The screen shot shows both methods where position 5 has been adjusted by 16mm UP using the slide bar, and the rest have been typed by selecting the relevant positions in the Adjusted Level Column.



When the floor levels are correctly adjusted, the user may then update the adjusted levels.

Until the button **Update Adjusted Floor Levels** is selected, nothing will be changed within the lift controller. **The action of selecting download to the lift controller will NOT update the data.**

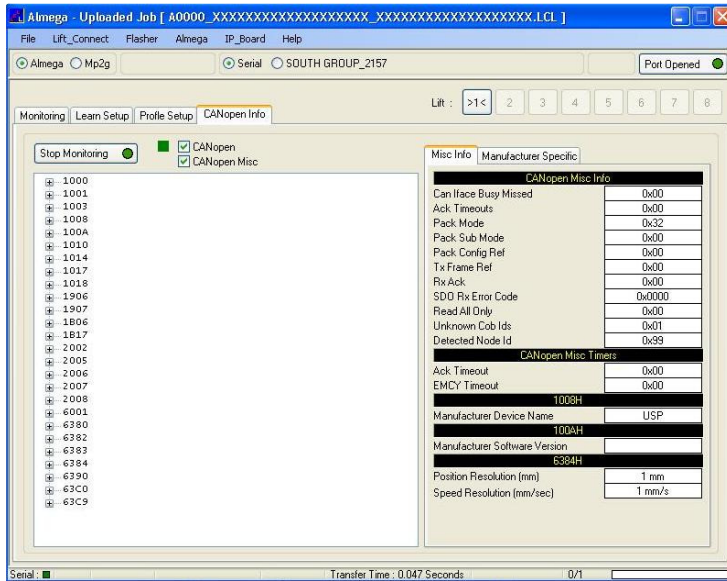
## 9.5) Profile Setup



Parameters for the position device are found within the Profile Setup. Other parameters relating to the positioning system are found mainly in Travel (speeds) and floor speed setup. Within this window (as shown) the profile can be adjusted as the selected parameters. The profile is drawn on the screen according to the parameter values, thus simulating the expected speed profile of the lift. Parameters are changed by Clicking on the boxes, and typing in values, or toggling the value when a Yes / No option. **Parameters may only be updated when stationary else the message “Lift Busy” appears.**

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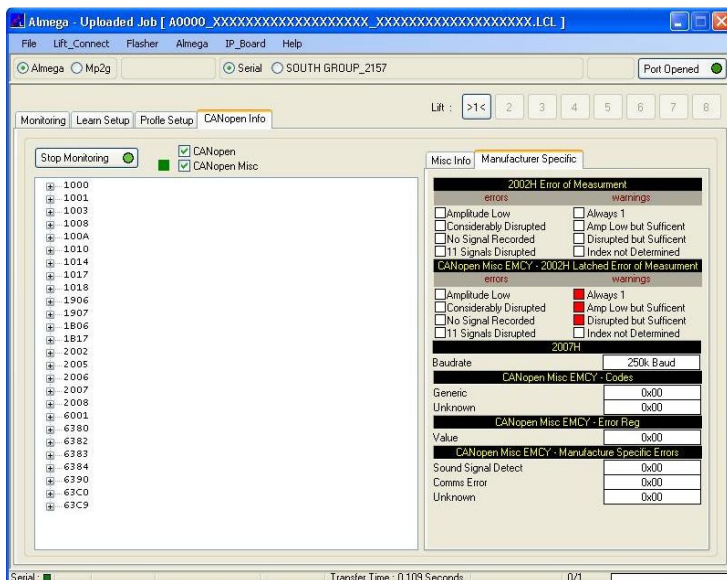
## 9.6) CANopen Info



Information relating to the CANopen interface can be found by selecting the CANopen info tab.

During the initialisation sequence (i.e. switch on) the position device is configured using the CANopen protocol. This information as well as other debug information is then extracted from device at regular intervals.

Main information includes the Device Name, Software version and Position Resolution.



Within a CANopen device there is a manufacturer specific section. Within this section important information is accessible. The window (as shown) highlights information such as warnings and faults associated with the Schmersal USP device. The lift processor latches the faults to show a history of any warnings / faults, current faults are also shown.

When an EMCY (emergency) message occurs, the display will show the error, and its occurrence will be displayed as an incremental count.

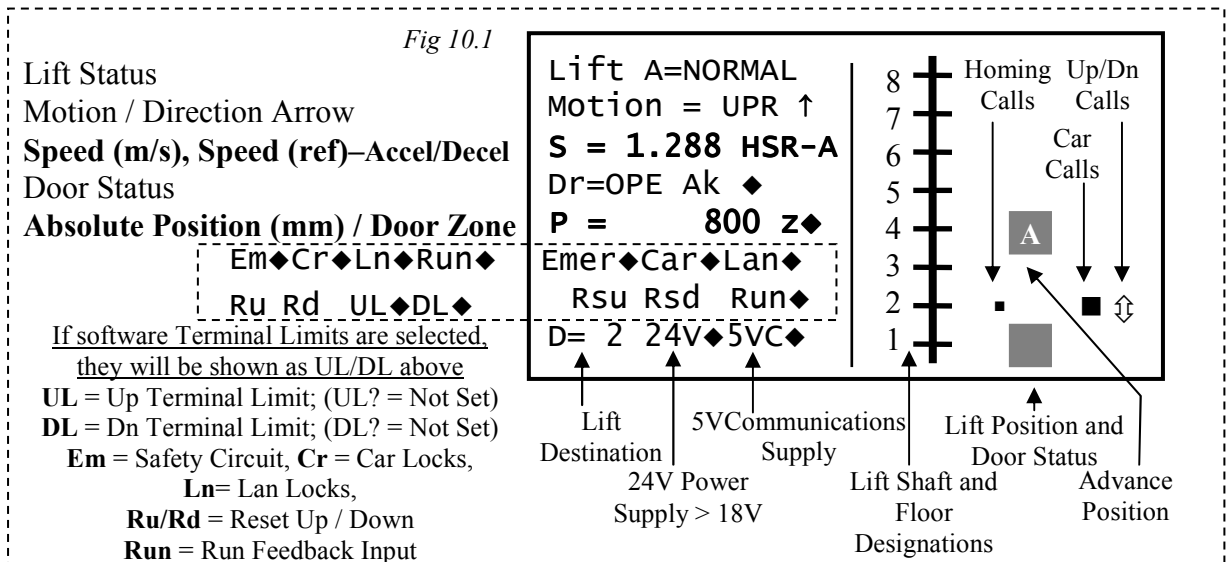
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## 10) Keypad Interface

The keypad interface provides a user friendly interface for the positioning system. Parameter settings, floor level adjustments, and basic monitoring / diagnostics are accessible.

### 10.1) Lift-viewer Monitoring

The Lift-Viewer screen has been enhanced for the positioning system to include Speed and Position information. The door / floor level zone indicator has also been included, whilst the Stopping vanes (STU / STD), and Stepping Vane (ST) have been excluded since the system no longer uses those signals. Fig 10.1 below shows the information for the positioning system (in **Bold**). Also the variation for when Software Terminal Limits is selected; is shown.



The Lift Status Message may show information relative to the positioning system as below:

- “Lift A = LEARN” = Learning Run in progress.
- “Lift A = PSD EF” = Position Device Emergency Fault.
- “Lift A = PSD CL” = Position Device Communications Lost.
- “Lift A = PSD FL” = Position Device Fault.

*Note: where faults appear it is also important to interrogate the fault logger to determine the cause for these faults.*

The Speed Reference will show information relative to the target speed as below. If the system is set for “Direct to Floor” control i.e. “Speed Profile Control” = YES, further indication will show whether the lift is accelerating, or decelerating.

- “000” = Target Speed is Zero (i.e. whilst starting / stopping).
- “HSR-A” = Target Speed is High, A= Accelerating.
- “HSR” = Target Speed is High, (and reached High speed if DTF)
- “MS1-A” = Target Speed is Medium Speed 1, A= Accelerating.
- “FIN-D” = Target Speed is Finish Speed, D= Decelerating.

The **Advance Position** represents the floor position at which the lift is next available to stop if the destination is also at that floor. As the speed increases the advance position will also change (increase going UP, and decrease going DN) showing the lift has effectively passed floor(s) at which it would be unavailable to slow for. The positioning system ensures that system calls i.e. “late calls” do not cause the lift to overshoot, or lose its position.

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## 10.2) Learning Run (Keypad)

The learning run will function as described in 8.2: *“The lift travels from the bottom position to the top position, and back again on reduced speed. As the lift travels past the floor level / door zone vanes, a position reading is recorded. Hopefully little or no adjustment to the floor levels will be carried out, to complete the setting of the floor levels.”* The learning run speed may be set by changing the parameter in Travel Setup (see page 11; 7.2). Check and set the positioning system overrun parameters, also terminal limit distances (if software terminal limits selected). For more detail regarding the learning run, please refer to the relevant quick setup guide.

### 10.2.1) Learning Run Initiation (Keypad)

A Learning Run may only be initiated whilst in the “Lift Viewer Screen”. This is a two key operation using (→ + ↑), where → has to be pressed and held, then pressing ↑ will initiate the learning run. A screen will appear as below:

Pressing and holding F1 at anytime will display the “Lift Viewer” screen as in Fig 10.1. Letting go will return to the Learning run information screen (as below).

Please Take Lift to  
Bottom Floor. Ensure  
Lift is at Floor Lev  
And on the Z sensor  
THE LEARN RUN WILL BE  
UNSUCCESSFUL OTHERWISE  
Press ENTER = Confirm  
MODE = Quit at Anytime

It is important to note the lift has to start near, or at the bottom floor level, and be on the Floor Level / Door zone sensor; otherwise the Learning Run will FAIL. This bottom floor level will be recorded as the 1<sup>st</sup> learned level (once started). Pressing ENTER starts the learning run, pressing MODE will abort the learning run at anytime. Floor levels will not be updated unless the learning run is completed and successful, despite any learned information.

If ENTER is pressed the “Lift Viewer” screen will appear as in Fig 10.1. The Lift Status Message will show: “Lift A = LEARN” (Learning Run in progress), and the learning run will now proceed. If MODE is pressed the Learning Run will abort, and the Learning Run Report screen will appear as described in 10.2.3.

### 10.2.2) Learning Run Speed adjustment (Keypad)

During the learn run, the actual lift speed is monitored against the target speed. If there is a difference a screen may appear (as below, on Magnetek HPVx-VF drives only) to adjust the motor RPM. The user can select ENTER to automatically adjust, or MODE to leave it as it is.

For the positioning system it is very important that the lift DOES run at the target speed. During the learn run this is checked and corrected by adjusting the relevant parameter within the motor drive.

\* Adjust Motor RPM \*

Current RPM = 11639  
Running Slow by 8.69%

Auto Adj RPM to 12651  
Press ENTER = Confirm  
Press MODE = Cancel

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### 10.2.3) Learning Run Report Screen (Keypad)

After the initiation of a Learning Run, whether passed or failed, a report screen will be generated. Below shows that the learn run has passed:

```
*Learning Run Report*

LEARNING RUN PASSED

Press ENTER to Finish
```

Below shows that the learn run has failed, but also displays the reason for failure, the lift position at which it failed, and the absolute position at which it failed (in mm).

```
*Learning Run Report*

LEARNING RUN FAILED
ABORTED ERROR
Lift Position = 1
Position =      5203

Press ENTER to Finish
```

For a list of learning run failures, see page 25, “Learning Run Failures”.

### 10.3) Position System Setup (Keypad)

Access to view and change ALL the Position System parameters can be achieved from the keypad. Pressing MENU will show the Position System setup in the menu list as below:

1) The keypad keys (↑ and ↓) can be used to scroll through the menu list as below:

2) Pressing ENTER will display the Position System Setup as below:

```
EVENT HISTORY
ENGINEERS SELECTION
ENTER CALLS
LIFT VIEWER
INPUT OUTPUT VIEWER
GROUP / WAITING TIMES
POSITION SYSTEM SETUP
EXTERNAL DEVICES
```

```
POSITION SYSTEM SETUP

FLOOR LEVELS
POSITION DEVICE FITTED
SPEED PROFILE CTRL
OVERRUN TOP
OVERRUN BOT
```

Most parameters are accessible via password level 1 (i.e. Engineers Entry), however parameter changes such as “Load all Defaults” are on higher level passwords (to prevent accidental overwriting). Parameters and their adjustments are described in Section 7 (p 10).

Engineers Entry is made via a two key operation using (MODE + ENTER), where MODE has to be pressed and held, and then pressing ENTER will set password level 1.

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### 10.3.1) Floor Level Setup (Keypad)

After Pressing ENTER on FLOOR LEVELS, the screen below will be displayed:

```
FLOOR LEVELS in mm
FLOOR [1 ]
ADJUST [0 ]
LEVEL [      5665]

RIGHT.....
MODE+UP Moves Cursor
POS Scale DESCENDING
```

Pressing Mode and UP moves the Cursor between FLOOR, ADJUST, and LEVEL. The keypad keys (↑ and ↓) can be used to change the value within the brackets as described below:

**FLOOR:** This is the Lift Floor Position, i.e. the number of recorded floor positions. *Some Positions will be displayed but cannot be changed as below.*

**ADJUST:** This is the adjustment that can be made to the floor LEVEL position. It has a maximum value of 1000mm for each time ENTER is pressed. The adjustment direction will appear when the value is altered. i.e. 100mm UP, or 5mm DN etc. The text “*RIGHT Arrow Step x1*” will appear when the cursor is next to this option (as indicated by *RIGHT.* above). The adjustment step is therefore selectable by pressing the RIGHT ARROW for steps of x1, x10, and x100. Pressing ENTER adjusts the floor LEVEL position. This option will be used mostly for minor floor level adjustments.

**LEVEL:** This is the absolute floor position of the floor LEVEL. Adjusting this allows the user to enter numbers in absolute format, thus major floor adjustments are entered here. Also if the user wishes to enter floor levels without a learning run, this option is best suited. The text “*RIGHT = Select Digit*” will appear when the cursor is next to this option (as indicated by *RIGHT.* above), thus the position is altered one digit at a time. Pressing ENTER adjusts the floor LEVEL position.

#### Positions displayed that cannot be changed

The absolute positions of the overruns top and bottom will be displayed in the floor setup screen but cannot be changed. Also if Software Terminal limits are selected they also will be displayed. The order in which parameters will be displayed is shown below:

#### **Software Terminal Limits NOT Selected**

- 4) *Overrun Top*
- 3) Floor (num floors)
- 2) Floor 1
- 1) *Overrun Bottom*

#### **Software Terminal Limits Selected**

- 6) *Overrun Top*
- 5) **Up Terminal Limit**
- 4) Floor (num floors)
- 3) Floor 1
- 2) **Down Terminal Limit**
- 1) *Overrun Bottom*

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### 10.3.2) Manual Floor Level Setup (Keypad)

Where possible it is advisable to setup floor levels automatically by carrying out a learning run, and making fine adjustments afterwards as described above: However to enter floor level values manually requires a certain procedure that must be followed as below:

- i) Load Position Device Defaults (Password Level 2 is required)
- ii) Set the Parameter “POSN DEV FITTED” to YES.
- iii) Set the Parameters “OVERRUN TOP” and “OVERRUN BOTTOM”.
- iv) If Software Terminal limits required, also consider the relevant parameters as **10.3.3** below.
- v) Determine whether or not the Position Scale is Ascending, or Descending.  
An **Ascending** scale means the floor LEVEL positions increase in value from BOTTOM to TOP (i.e. receiver at bottom).  
A **Descending** scale means the floor LEVEL positions increase in value from TOP to BOTTOM (i.e. receiver at top).
- vi) For an **Ascending** Scale enter the Floor LEVEL at the **TOP position 1<sup>st</sup>**, and then enter the rest downwards.
- vii) For a **Descending** Scale enter the Floor LEVEL at the **BOTTOM position 1<sup>st</sup>**, and then enter the rest upwards.

### 10.3.3) Manual Setup of Terminal Limits

Setting of the Terminal limits may be done automatically during a learning run if stopping on the terminal limits is not required beforehand. However if terminal limits are required before a learn run (i.e. when on inspection / during learning run) Terminal Limit positions may be configured manually by setting top and bottom floor levels as below:

- i) Ensure the Parameter “POSN DEV FITTED” = YES.
- ii) Ensure the Parameter “SOFTWARE TERM LIMITS” = YES.
- iii) Set the Parameters “UP TERM LIMIT DIST” and “DN TERM LIMIT DIST”, typically 25mm.
- iv) Take the lift to the terminal floors and record the Absolute Top / Bottom Position Values, Position Value found by pressing F1 and reading P=????
- v) Enter the values into the system as FLOOR LEVEL SETUP.
- vi) The terminal limits will now be set e.g. 25mm above and below top/bottom floor levels. The lift will stop on the limits on Inspection Control, and during a learning run.

*Note: If the Lift Viewer shows UL? or DL?; this means software terminal limits are selected, but not configured, and will be ignored.*

### 10.4) CANopen Configuration Setup (Keypad)

The Position Device connected to the Almega system has to be configured for CANopen operation before it will work properly. This configuration is an automatic process which occurs when communications is established with the Position Device (i.e. Power restoration, or communications restored). Generally the user need not be concerned with this operation! The process only updates and stores the configuration if it is different from expected. An option has been included to force a configuration update. This is achieved by pressing and holding the UP ARROW (↑) on Power Restoration, The event “CANOPEN CONFIG WRITTEN” will be stored in the Event Logger.

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