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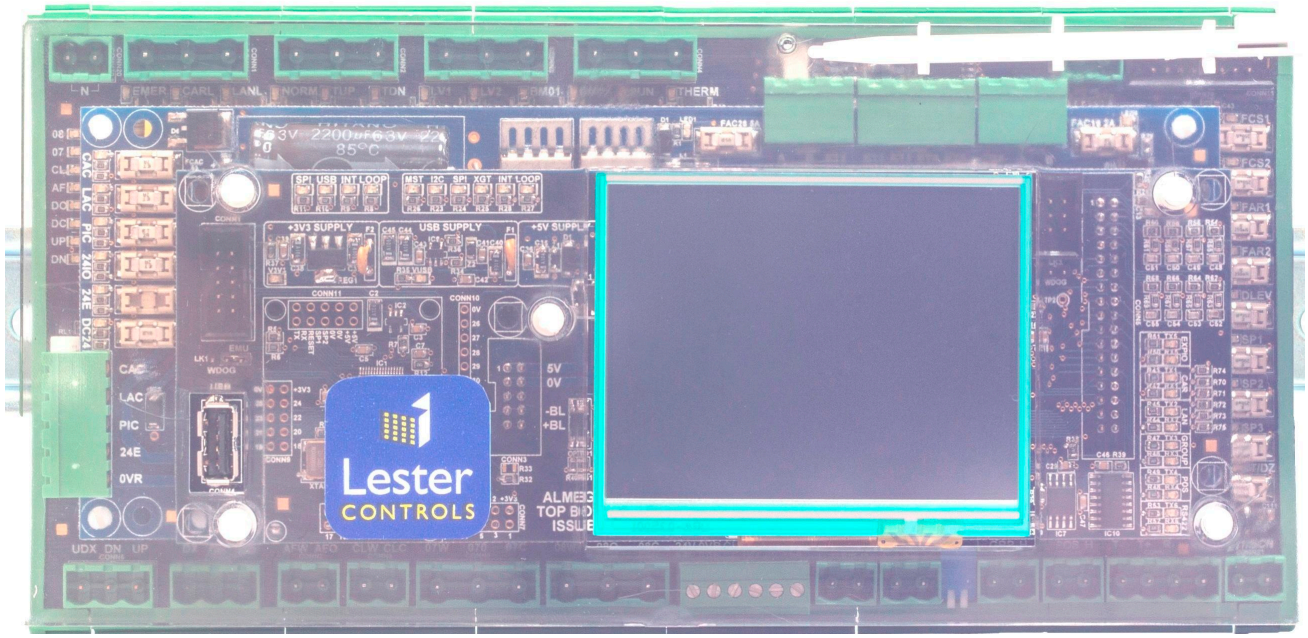

TECHNICAL MANUAL
FOR THE ALMEGA 2
MICROPROCESSOR SYSTEM
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1) Introduction

The ALMEGA 2 microprocessor has been designed as a successor to the ALMEGA. The product retains the proven technical ability of the ALMEGA, plus the addition of many new features / enhancements. Utilising the latest technology it has adopted TFT LCD technology with touch screen for a user friendly menu & programming interface. Also, a more powerful Dual Core micro processor has been chosen to handle the enhanced display and allow more processing for lift functions. USB technology has been implemented to provide a high speed serial interface to PC's / Laptops, but also to provide an expanded memory system using a USB memory drive. The USB "stick" can be used to store backup parameters and software versions, and also can be used for software updates.

The system consists of a Base IO module, and optional Expansion IO modules. The Base IO module contains the lift micro processor, USB micro processor, Wi-Fi module, Power supplies and "controller IO" connections. The expansion IO modules provide IO for the lift shaft and are enclosed in custom designed DIN rail mounting modules, thus the system is modular depending upon the number of floors and features. Expansion IO may also be mounted within the lift shaft. This does NOT use the same DIN RAIL modules but instead uses the IO associated with Lester Controls "pre-wired" Serial IO system. These provide functions for the landing IO as well as car IO.

Direct serial communication to selected Position Devices and motor drives (i.e. VVF) provides "Direct to Floor Control" for time and energy efficiency, better reliability, control, and a wealth of information can be accessed for diagnostics / monitoring purposes. The microprocessor will also connect directly to Lester Controls serial indicator and speech units, providing full programmability of up to 32 floors and many messages and features.

Windows application software is available to allow the user to change parameters and settings to suit the lift installation. All parameters, IO, serial speech / indicator are fully programmable. The software also provides the user with diagnostic tools for viewing detailed information regarding the status of the lift, motor drive and positioning system. The information is also available remotely via the Internet / Intranet connection with the Internet Monitoring, add on option.

2) Manual Supplements

There are a range of manual supplements available for specific information regarding the ALMEGA 2 lift control system. The information in these supplements provide additions for special / specific lift functions that would not normally required within the scope of this manual. Some supplements available are Internet connectivity, serial communications with an inverter drive, and Emergency supply operation etc. Contact Lester Controls for availability, or visit the web site to download those currently available.

3) List of Equipment

1) ALMEGA 2 Microprocessor system.

2) Lap top / P.C. for programming the processor (if desired)

3) 1 USB 2.0 Communication Cable, Male to Male, Type A.

4) Switching onto TEST Operation for the first time

The Lift Viewer or Input Output Viewer from the main menu may be used at this stage to aid with testing.

Installation state:
The Motor, Thermistors, Fan and Brake etc. have been connected to the Control Panel.
The safety and lock circuit are in a state where the door contacts, emergency stops etc., are making contact providing continuity through terminals:
(**OTL - OSG - PSW - G1 - G2 - G3 - G4**), for a Hydraulic Lift, and
(**OTL - OSG - G1 - G2 - G3 - G4**), for a Traction Lift.
The wiring has been checked and all cables are connected correctly.
The fuses are in their correct places and of the correct size and type.
The lift is switched to **TEST** via the Car Top Control or manually by leaving the connection between **TTS** and **TS** open circuit, also continuity is made from terminals **TTS** and **TS1**.
Check there are no obstructions in the lift shaft.
Provisionally set the lift and door motor overloads.
Check that the car and landing doors are closed fully (if fitted at this stage).

The lift can now be switched on:
Check the incoming three-phase sequence is correct (PFRR relay is energised)
Check the LED's **EMER**, **CARL**, **LOCK** are illuminated on the mains input board, or look on the LCD display (i.e. INPUT VIEWER), or check the LCD display default screen.

Making the following temporary connections can now drive the lift:
To travel UP = **TF** to **TU**
To travel DOWN = **TF** to **TD**

The following checks should be made before continuing with moving the lift:
1) Check that the Emergency stop buttons, Locks and Safety circuit (if applicable) will stop the lift instantaneously shortly after the lift motor starts to rotate.

2) Run the lift and check that the direction of rotation is correct.

3) Run the lift and check that the brake and ramp voltages are correct

4) Check the door operation (if fitted) by using the car top control buttons to make contact between terminals:

CLOSE = **DTF** and **DC**
OPEN = **DTF** and **DO**

5) Check selector stepping and levelling switches are in place and are functional.

6) After Test operation move the lift to the lowest level possible, park with doors closed and switch off the control system.

Note:
If you have any problems at this stage please refer to the fault finding section of this manual.

5) Switching onto NORMAL Operation for the first time

The Lift Viewer or Input Output Viewer from the main menu may be used at this stage to aid with testing.

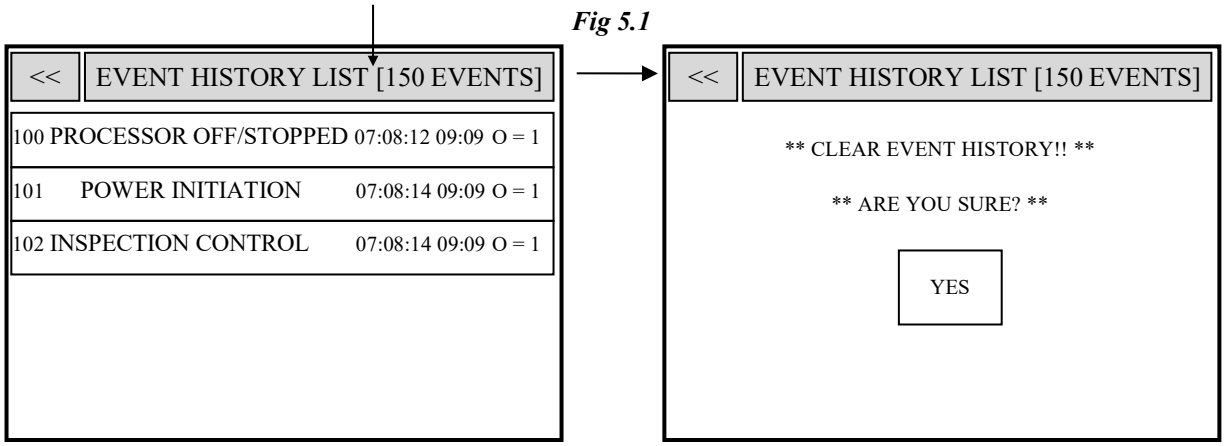
Installation state:
The lift installation is complete and is to be operated normally for the first time. The tape head, door operator, Emergency stop buttons, locks, safety circuit, shaft switches, proximity and levelling signals have been checked on TEST control as previously instructed and are operating correctly. The pulsing and levelling signals are in the correct sequence as on the shaft and vane layout drawing. The lift is at the lowest floor level with the reset signal energised.

The lift is switched to **TEST** via the Car Top Control or manually by leaving the connection between **TTS** and **TS** open circuit, also continuity is made from terminals **TTS** and **TS1**.

The lift is switched onto NORMAL operation via the car top control, i.e. a connection should be made between terminals **TTS** and **TS**, and open circuit from terminals **TTS** and **TS1**.
The lift should not be on any other form of independent service, i.e. Fire or Service control.
Ensure no shaft obstructions exist. The lift can now be switched on, and the following suggested test procedures maybe carried out:

1) Purging of the Event Logger:
Whilst in the menu **Event History**, pressing the EVENT HISTORY LIST button (as shown) invokes an "Are you sure" screen to clear/purge all events stored in the Event Logger. Press YES to confirm, or press << to cancel.

Fig 5.1



2) Testing the pulsing and levelling signals (STU/STD & STEP):
This can be achieved by placing calls to each floor in turn, in both the UP and DOWN direction, ensuring correct selector stepping and stopping sequence. Correct any problems with the vanes before proceeding to the next stage. Once correct, run the lift to the terminal floors in both directions to check vane operation.

5.1) Limits (Slowing/Stopping) and Buffer Tests

A set of dedicated buttons are available to assist in the testing of the slowing limits, stopping limits and lift buffers (i.e. buffer test). To make the buttons appear press and hold the shaft area of the screen for 5 Seconds. Once the buttons appear they need to be held under "constant pressure" to invoke the function. If the buttons are not pressed for a period of 20 minutes they will disappear and the normal lift viewer screen will be shown, otherwise the timer is reset when the screen is pressed. Also to clear the buttons, simply press MENU and press LIFT/GROUP VIEWER to re initialise the lift viewer.

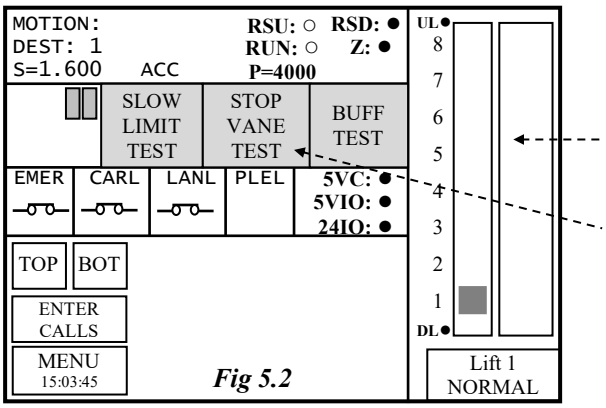


Fig 5.2

Press and Hold the shaft Area for 5 seconds to make the test buttons appear.

3 Test Buttons appear in the area dedicated for extra door operators.

3) Testing of Slowing switches:
Press **TOP** button to register a top car call and, then press **SLOW LIMIT TEST** button under constant pressure to inhibit the STEP signal, thus forcing the lift to slowdown via the slowing limit. Press **BOT** to register a bottom car call and repeat the above process.

4) Testing of Terminal switches:
Press **TOP** button to register a top car call and then press **STOP VANE TEST** button under constant pressure to inhibit the stopping signals (e.g. STU and STD), thus forcing the lift to stop on the terminal limit. Press **BOT** to register a bottom car call and repeat the above process.

5) Testing of the Lift Buffers (Buffer Test):
Note this function is to be used only by responsible Lift Test Engineers!
Press **TOP** button to register a top car call and then press **BUFF TEST** button under constant pressure to inhibit the **slowing**, **slowing limits** and **stopping signals**, thus forcing the lift to crash stop onto the lift buffers on HIGH SPEED! Press **CPB** to register a bottom car call and repeat the above process.

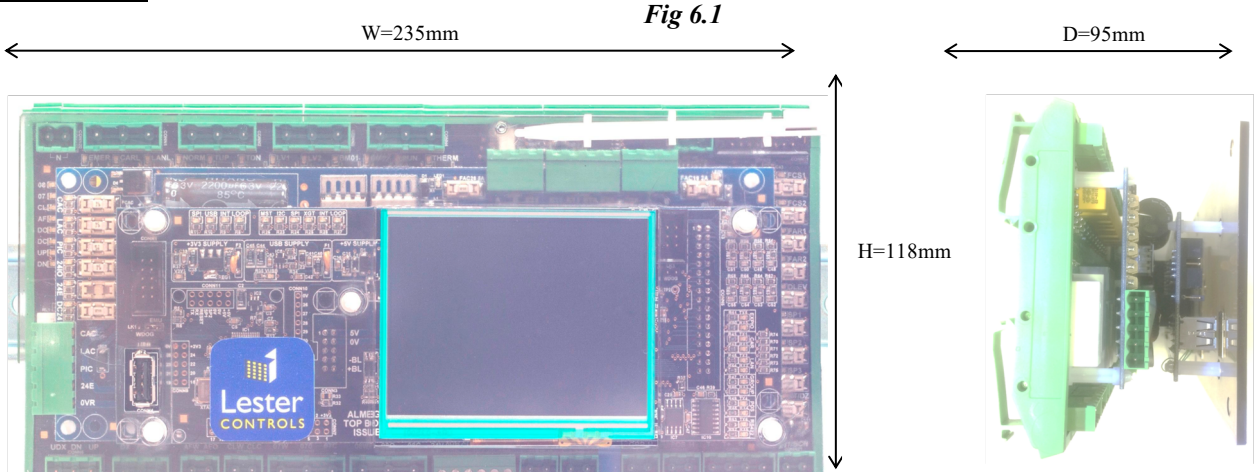
Note:
If you have any problems at this stage please refer to the fault finding section of this manual.

6) Hardware Section

6.1) Physical Dimensions

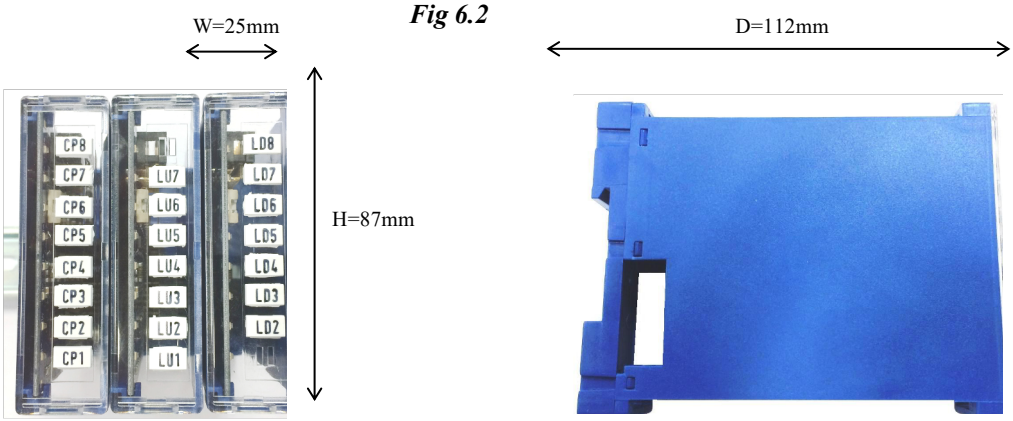
Base Unit

Fig 6.1



IO Module(s)

Fig 6.2



The base Unit and IO Modules are DIN rail mounting. Up to 30 modules can be added for extra IO. The modules clip into each other via a connection system at the base, thus no extra cables are required to add IO. The width spacing is 25mm, thus for 5 modules a space of 125mm is required, and for 10 modules 250mm is required.

6.1.1) Horizontal Fixing

The Base Unit and IO modules are typically mounted horizontally as shown below. The connection from the Base Unit to the IO modules is via a purpose made “screened” communications cable. The IO modules may be mounted next to the Base Unit or away from it on another a separate piece of DIN rail. The cable length can be adjusted to suit.

Fig 6.3

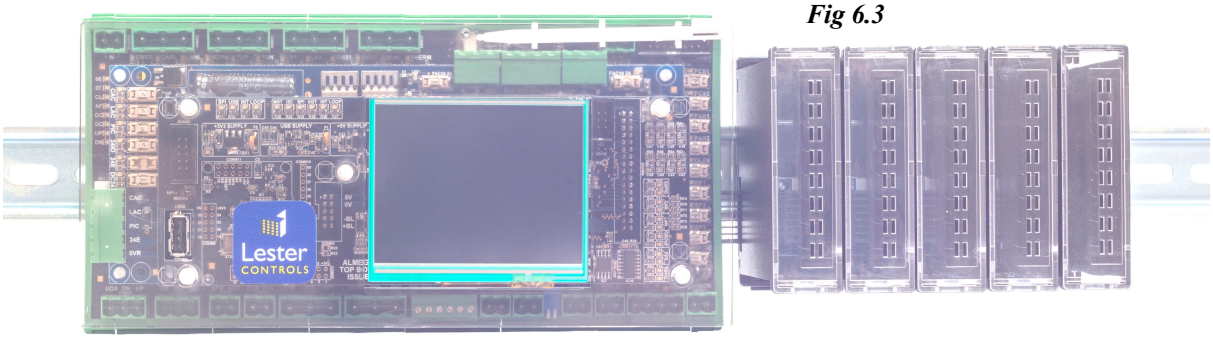
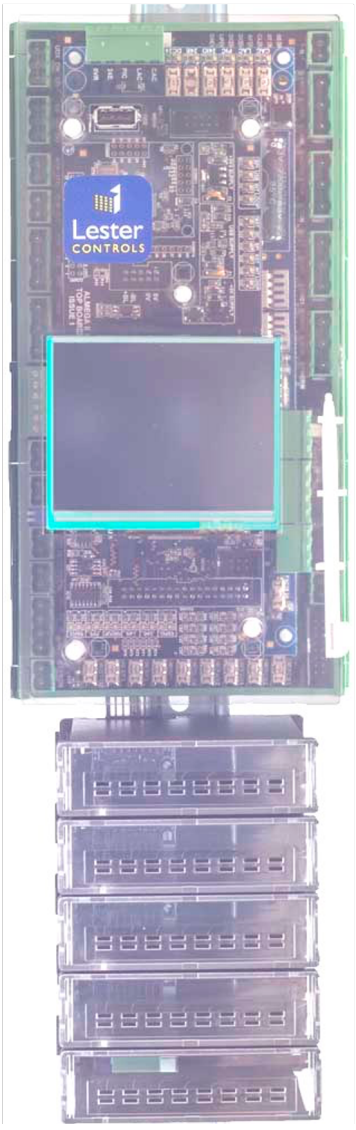


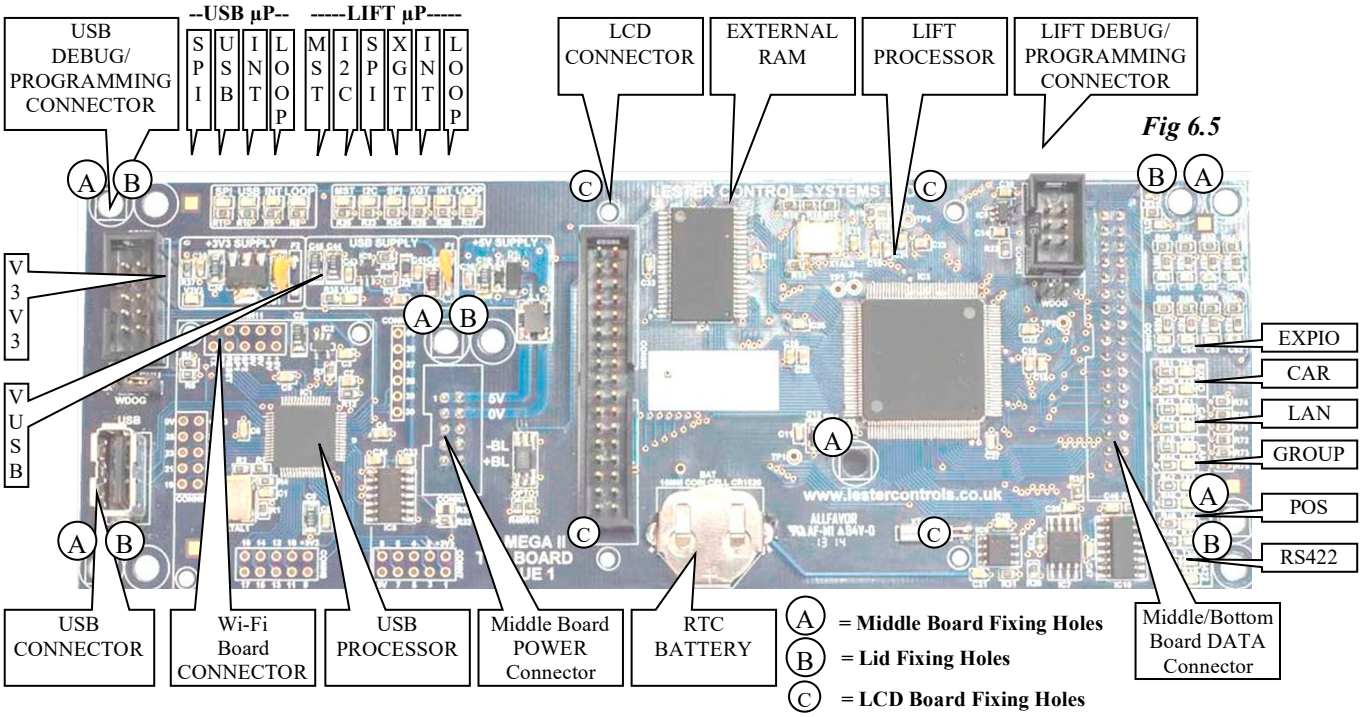
Fig 6.4

6.1.2) Vertical Fixing

The Base Unit and IO modules can be mounted vertically as shown aside. This is implemented typically where there are space restrictions within the control panel (i.e. MRL controllers). The LCD can be rotated from its horizontal position to vertical, thus the menu & user interface maintain the same resolution. The connection from the Base Unit to the IO modules is via a purpose made “screened” communications cable. The IO modules may be mounted next to the Base Unit or away from it on another a separate piece of DIN rail. The cable length can be adjusted to suit.



6.2) Base Unit Top Board



The Base Unit Top Board (shown above) contains the main Lift processor and also the USB processor. It also provides control and indication for the lift. The TFT LCD display combined with the touch screen provides the user with an easy to use menu interface for displaying lift/IO information, and changing parameters.

LED indication is provided for the **LIFT PROCESSOR system** functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
LOOP	Processor Program Loop	10 Times a second Approx
INT	Processor IO Interrupts	Every 20 Milliseconds
XGT	Processor 2nd Core Busy	Illuminated when Processor Activity
SPI	Communications to the USB µP	Illuminated when Communications Activity
I2C	Communications to the RTC & Parameter Memory	Illuminated when Communications Activity
MSTR	MASTER	On all the time when LIFT=MASTER

LED indication is provided for the **LIFT PROCESSOR communications** functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
XPIO:TX/RX	Expansion IO CAN Transmit/Receive	Illuminated when Communications Activity
CAR:TX/RX	Lift Car CAN Transmit/Receive	Illuminated when Communications Activity
LAN:TX/RX	Landing /Shaft CAN Transmit/Receive	Illuminated when Communications Activity
GROUP:TX/RX	Group CAN Transmit/Receive	Illuminated when Communications Activity
POS:TX/RX	Position CAN Transmit/Receive	Illuminated when Communications Activity
RS422:TX/RX	RS422 Comms Transmit/Receive	Illuminated when Communications Activity

LED indication is provided for the **USB PROCESSOR system/power** functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
LOOP	Processor Program Loop	5 Times a second Approx
INT	Processor IO Interrupts	Every 20 Milliseconds
USB	Communications to the USB Port	Illuminated when USB Activity
SPI	Communications to the LIFT µP	Illuminated when Comms Activity
V3V3	3.3V Power Supply	Illuminated when Supply Present
VUSB	USB Power Supply	Illuminated when Supply Present

6.2.1) LCD Board

The Almega 2 incorporates TFT LCD technology with touch screen for a user friendly menu & programming interface. The display size is 3.5 inch with a dot matrix of 320 by 240 RGB pixels, and 256K colours. The backlight is 400mW white LED, and the viewing is 140 degrees.

A purpose made board has been developed to mount the display and provide connections/fixings to the Base Unit Top Board. The board increases the mechanical strength of the display and at the same time reduces the "wear & tear" that may be caused by movement of the display and hence movement of the sensitive connection cables.
The board can be rotated from its horizontal position to vertical, thus the menu & user interface maintain the same resolution.

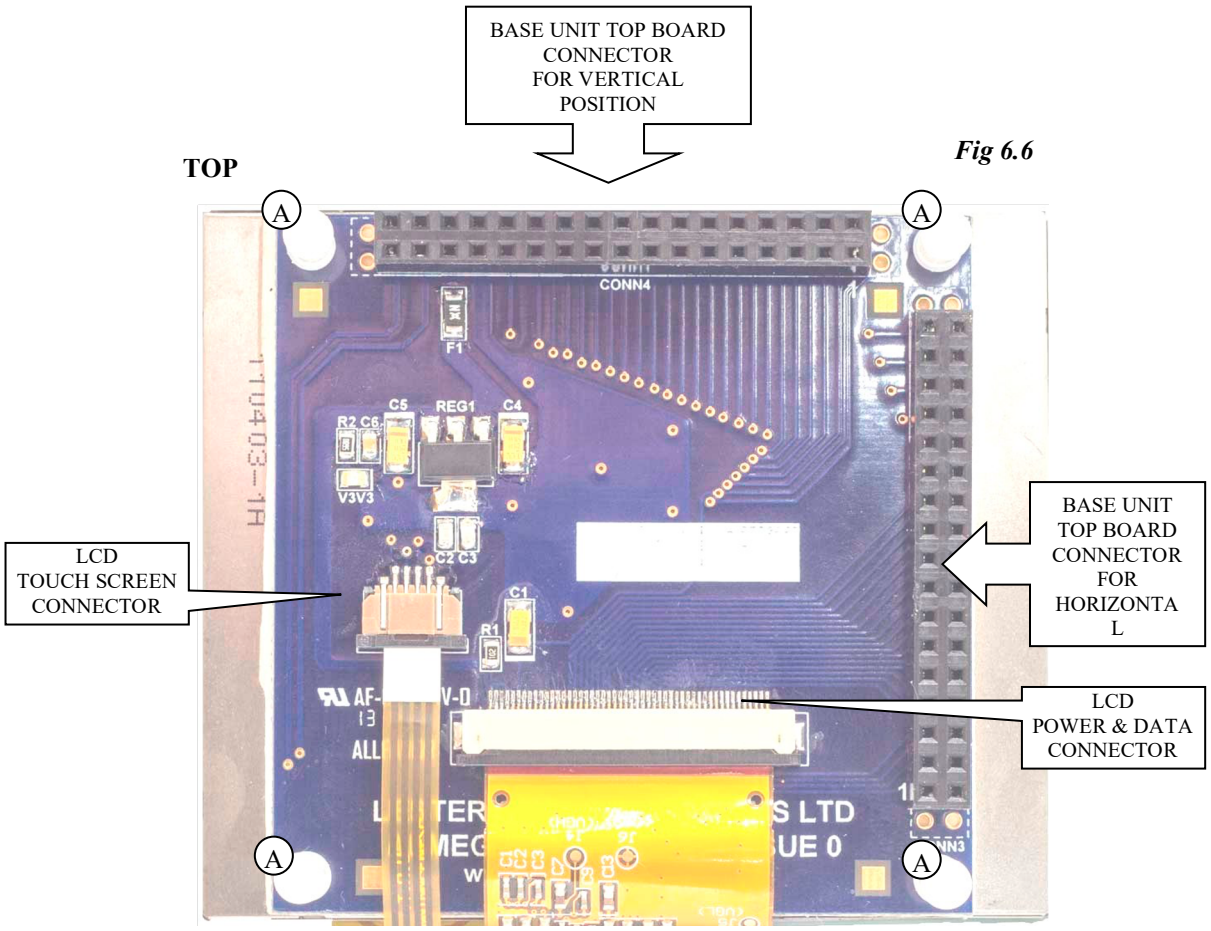
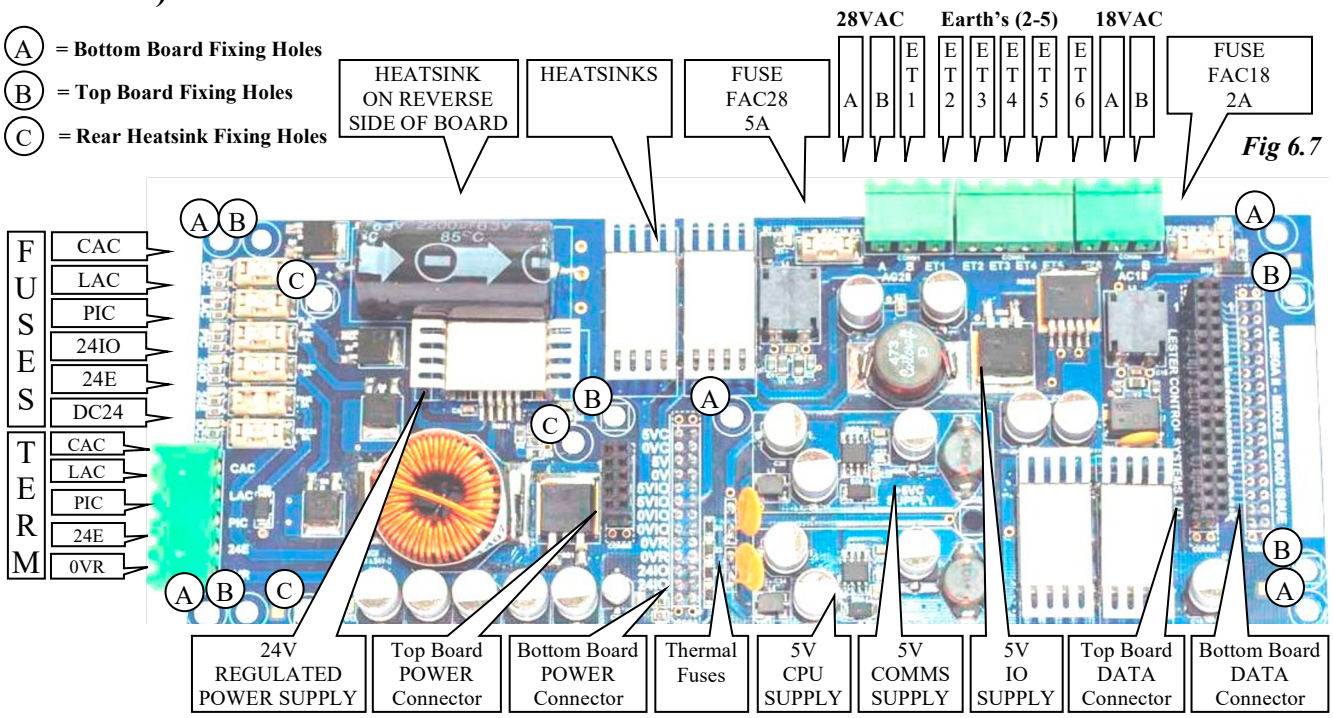


Fig 6.6

A = Base Unit Top Board Fixing Holes/Pillars

6.3) Base Unit Middle Board



The Base Unit Middle Board (shown above) contains the Lift power supplies. Separate 5V supplies have been implemented to provide isolation and modularity in the event of electrical noise and/or fault conditions. The 24V supplies are fully regulated. Quick Blow fuses protect the 24V supply outputs. Thermal / resettable fuses protect the 5V supply outputs.

AC Power Supply Inputs (LED indication is provided and illuminated when supply is healthy):

INPUT	FUNCTION	FUSE RATING	LED
AC18	18 VAC Incoming Supply	2A	AC18
AC28	28VAC Incoming Supply	5A	AC28

DC Power Supply Ratings:

SUPPLY	Functions	Derived From	Continuous	Peak
24V Regulated	24V Power Supplies	28V AC, CPU Transformer	**4A**	5A
5VIO Regulated	5V I/O Supply (Slot IO)	18V AC, CPU Transformer	3A	3A
5VC Regulated	5V Communications Supply	18V AC, CPU Transformer	1A	1A
5V Regulated	5V CPU Supply	18V AC, CPU Transformer	1A	1A

DC Power Supply Outputs (LED indication is provided and illuminated when the supply is healthy):

OUTPUT	FUNCTION	FUSE RATING	LED
DC24	24V DC Regulated Supply Feed	5A	DC24
CAC	24V DC Car Call Acceptance Supply	2A	CAC
LAC	24V DC Lan Call Acceptance Supply	2A	LAC
PIC	24V DC Position Indicator Supply	2A	PIC
24E	24V DC External Supply (Position Device)	2A	24E
24IO	24V DC Input / Output Supply (Slot IO)	2A	24IO

Earth Connections:

EARTH	FUNCTION	EARTH	FUNCTION
ET1	28V AC Filter Ground Reference	ET4	5V CPU Ground Reference
ET2	24V DC Ground Reference	ET5	5V I/O Supply Ground Reference
ET3	5V Communications Ground Reference	ET6	18V AC Filter Ground Reference

6.3.1) Power Supply External Transformer Inputs

The Power Supply External transformer is derived from the 415V supply and provides outputs as below:

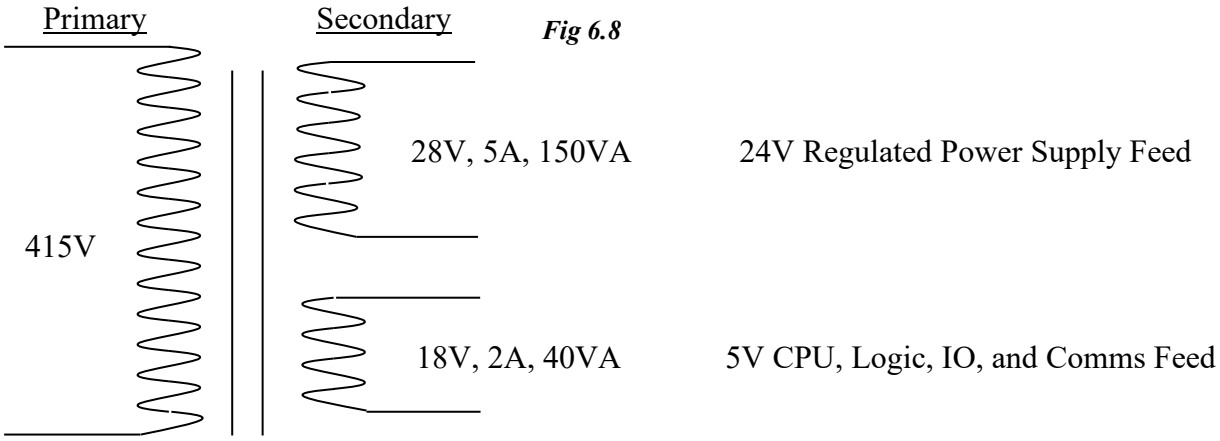
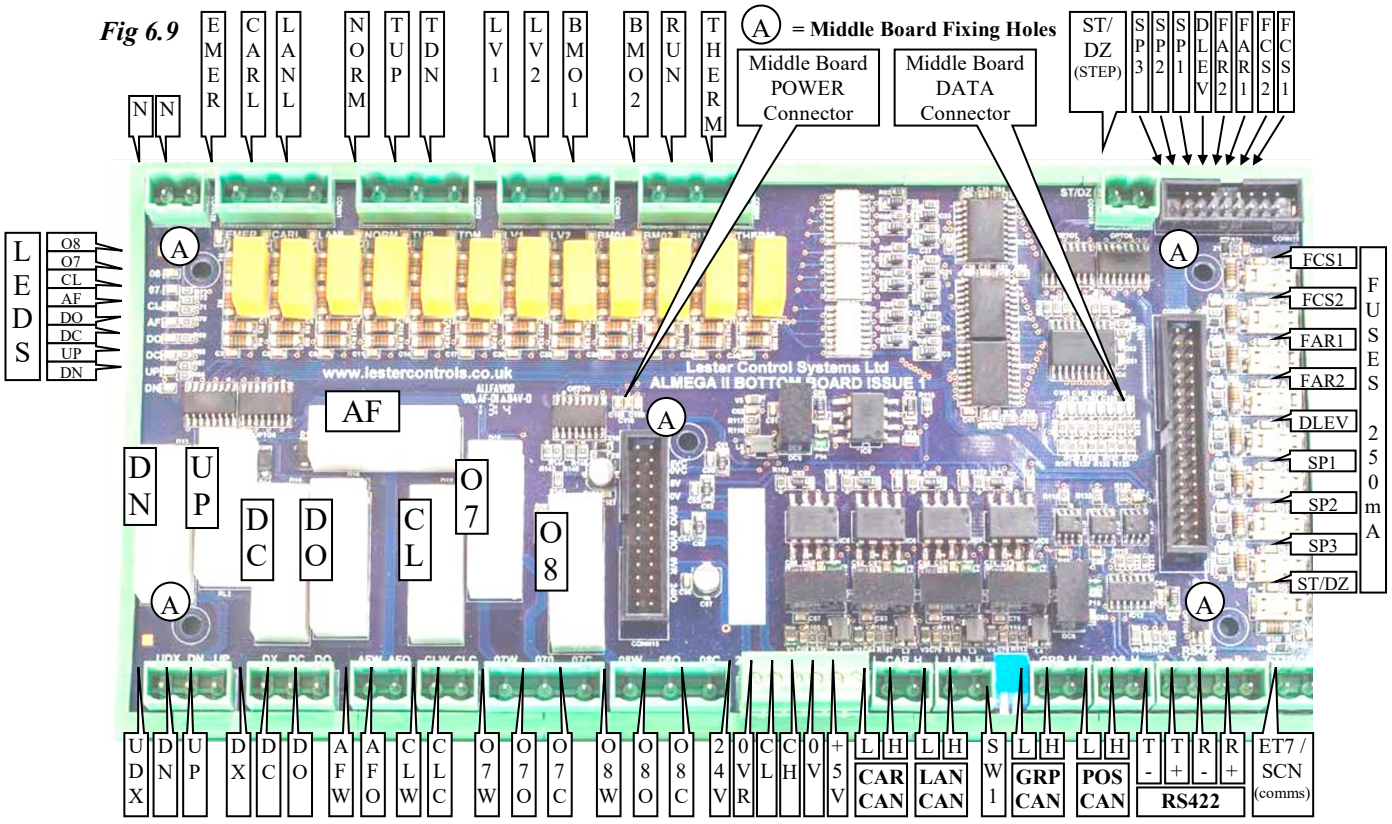


Fig 6.8

6.4) Base Unit Bottom Board

Fig 6.9



6.4.1) 110V AC Inputs (LED indication is provided and illuminated when input is asserted):

Terminal **N** = Neutral / Common return.

INPUT	FUNCTION
EMER	Emergency Stop Input (typically safety circuit immediately after the emergency stop(s))
CARL	Car Lock Input (typically safety circuit immediately after the Car Locks)
LANL	Landing Lock Input (typically end of safety circuit)
NORM	Normal Input (asserted when on Normal, from a contact of the TR relay)
TUP	Test Up Input
TDN	Test Down Input
LV1	Re-Levelling Vane 1 for Hydraulic Re-levelling
LV2	Re-Levelling Vane 2 (Re-level board feedback) for Hydraulic Re-levelling
BMO1	Brake Switch input 1for UMD brake monitoring (normally closed)
BMO2	Brake Switch input 2 for UMD brake monitoring (normally closed)
RUN	Run feedback input
THERM	Thermistor / Machine Room Temperature Exceeded Input

6.4.2) 24V DC Inputs (LED indication is provided and illuminated when input is asserted; also each input has an associated fuse of 250mA): Common return = **0V / Earth**.

INPUT	FUNCTION
FCS1	Fire Control Switch 1 input
FCS2	Fire Control Switch 2 input (secondary fire switch)
FAR1	Fire Alarm Recall 1input
FAR2	Fire Alarm Recall 2 input (secondary fire alarm)
DLEV	Drive Level Speed Reached input (ready to stop speed)
SP1	Spare input 1
SP2	Spare input 2
SP3	Spare input 3

6.4.3) Dedicated 24V DC Stepping & Door Zone Input (LED indication is provided and illuminated when input is asserted; also the input has an associated fuse of 250mA):

INPUT	FUNCTION
ST/DZ	Stepping and Door Zone input

6.4.4) Relay Outputs (LED indication is provided and illuminated when the output is asserted):

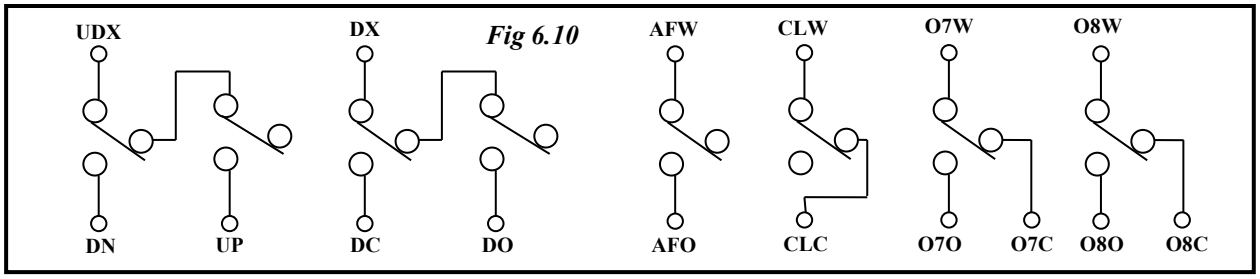


Fig 6.10

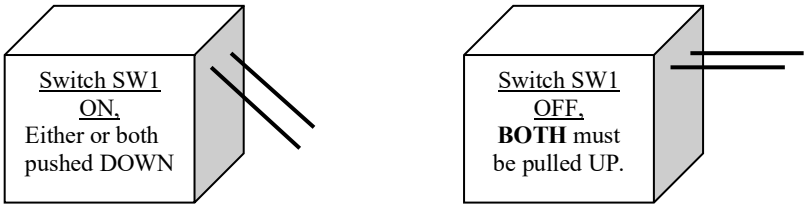
Output connections are shown above: UP / DN contacts are interlocked so that under a fault condition DN would take precedence. DO / DC contacts are interlocked so that under a fault condition DC would take precedence. All contacts are volt free, rated up to (5A@30Vd.c.) / (8A@250Va.c.); and may be used in safety critical circuits.

OUTPUT	FUNCTION
UDX	Up / Down Direction Pilot Relay Common
DN	Down Direction Pilot Relay Output
UP	Up Direction Pilot Relay Output
DX	Door Open / Close Pilot Relay Common
DC	Door Close Pilot Relay Output
DO	Door Open Pilot Relay Output
AFW	Alarm Filter Output Common (Wiper). Used in conjunction with Auto Dialler Alarm.
AFO	Alarm Filter Output (Normally Open). Used in conjunction with Auto Dialler Alarm.
CLW	Car Light Output Common (Wiper). Used for Car Light Energy Saving.
CLO	Car Light Output (Normally Closed). Used for Car Light Energy Saving.
O7W	Output 7 Common (Wiper). Spare Output
O7O	Output 7 Normally open. Spare Output
O7C	Output 7 Normally Closed. Spare Output
O8W	Output 8 Common (Wiper). Spare Output
O8O	Output 8 Normally open. Spare Output
O8C	Output 8 Normally Closed. Spare Output

6.4.5) SW1 (Group CAN Terminator DIL Switch) (See also Group Can Terminators P45):

The Group CAN terminators should be fitted on **2 lifts only** for a lift installation of 2 or more lifts. As a "rule" it's where the interconnections start and end. E.g. for a 4 car group the Group the CAN interconnections start at Lift 1 and end at Lift 4. Therefore, SW1 needs to be set to ON, on Lift 1 and on Lift 4. ON means the DIL switch is **"pushed down"** (a PIANO switch).

Fig 6.10.1



6.4.6) Communications Interface

Serial IO Expansion CAN Port:
Connections are provided to interface to the Expansion IO modules. Typically shaft related IO is implemented on the expansion IO. Communication to the modules is implemented using CAN. Connection is made via a custom made screened cable.

CONNECTION TYPE	FUNCTION	VOLTAGE
24V	+24V power supply	24V
0VR	24V power supply 0V / return	0V
CL	CAN LOW Communications	0-5V
CH	CAN HIGH Communications	0-5V
0V	5V power supply 0V / return	0V
+5V	5V power supply	5V

CAR CAN Connections. Communications to the lift car (CAN devices) are connected at this connector: Connections are made using screened cable.

CONNECTION TYPE "CAR"	FUNCTION	VOLTAGE
CH	CAN HIGH Communications	0-5V
CL	CAN LOW Communications	0-5V

LAN CAN Connections. Communications to the landing / shaft (CAN devices) are connected at this connector: Connections are made using screened cable.

CONNECTION TYPE "LAN"	FUNCTION	VOLTAGE
CH	CAN HIGH Communications	0-5V
CL	CAN LOW Communications	0-5V

GROUP CAN Connections. CAN Communications between lifts are connected at this connector: Connections are made using screened cable.

CONNECTION TYPE "GRP"	FUNCTION	VOLTAGE
CH	CAN HIGH Communications	0-5V
CL	CAN LOW Communications	0-5V

Positioning System CAN Connections. Communications to a CAN positioning system are connected at this connector: Connections are made using screened cable.

CONNECTION TYPE "POS"	FUNCTION	VOLTAGE
CH	CAN HIGH Communications	0-5V
CL	CAN LOW Communications	0-5V

RS422 Connections. Typically Communications to an inverter drive via RS422 are connected at this connector: Connections are made using screened cable.

CONNECTION TYPE	Description	VOLTAGE
R+	Receive Channel Positive	±13V
R-	Receive Channel Negative	±13V
T+	Transmit Channel Positive	±13V
T-	Transmit Channel Negative	±13V

ET7 Earth / Screen Connections. This connection is to be connected to Earth, and used to terminate the screen(s) of the communication cables.

CONNECTION TYPE	Description	VOLTAGE
ET7 / SCN	Earth Terminal 7 and Communications Screen Connection	0V

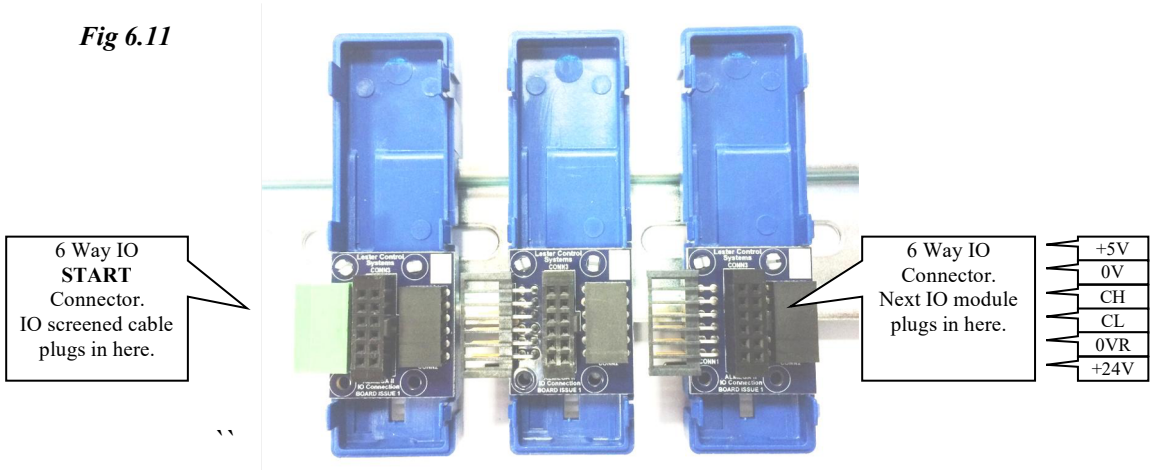
6.5) Expansion IO Modules

The IO connections boards are housed in a custom made DIN rail module as shown. The main body of the module has been omitted to show how the IO boards locate and interconnect. Both Power and CAN communications are “bussed” through the connections to each board. A “screened” cable from the Base IO module plugs into the START connector as shown. From then on further IO modules can be added up to a maximum of **30**.

6.5.1) IO Connection Board

IO Interconnections

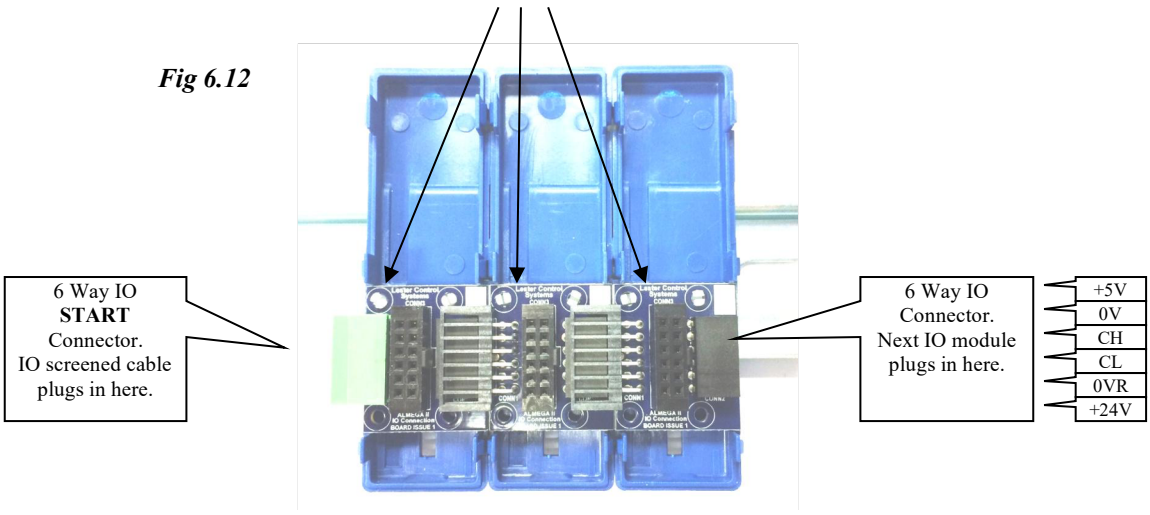
Fig 6.11



The picture below shows the modules interconnected. The IO boards such as “Mains Input Board” and “24V link Board” plug into the IO modules, and to the IO Board connectors as shown. The main body of the IO module guides the IO boards, and the lid secures the board in place.

IO Board Connections

Fig 6.12

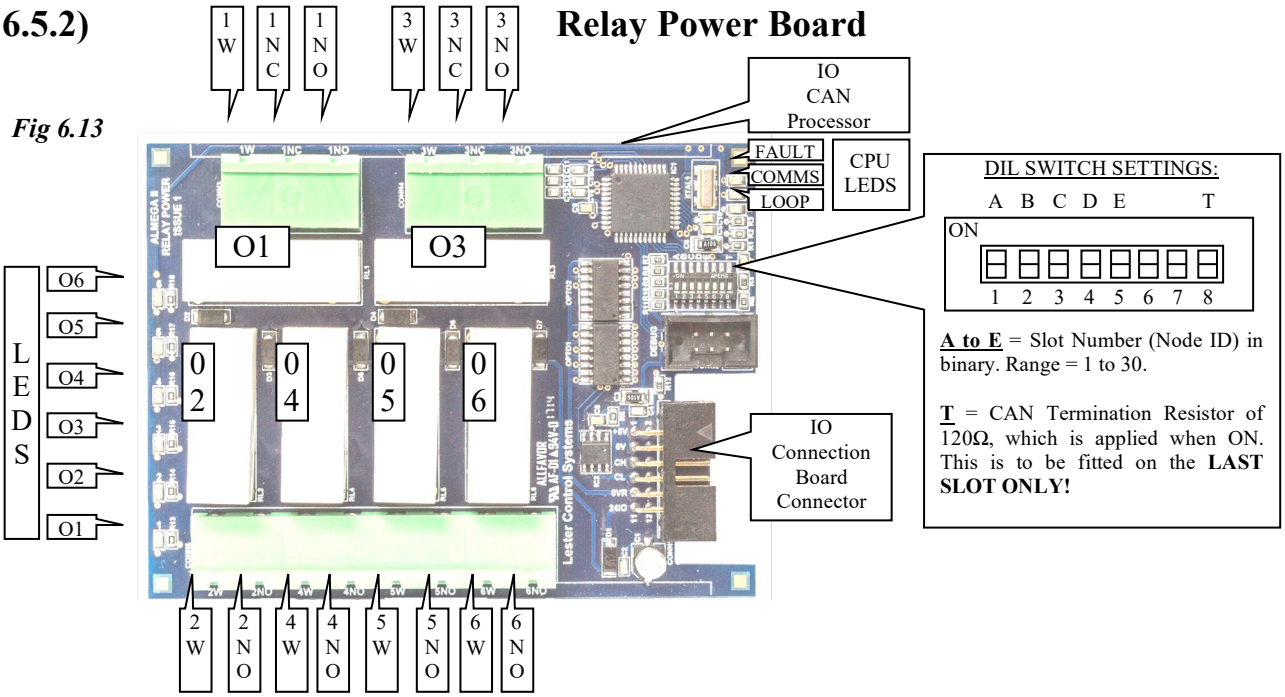


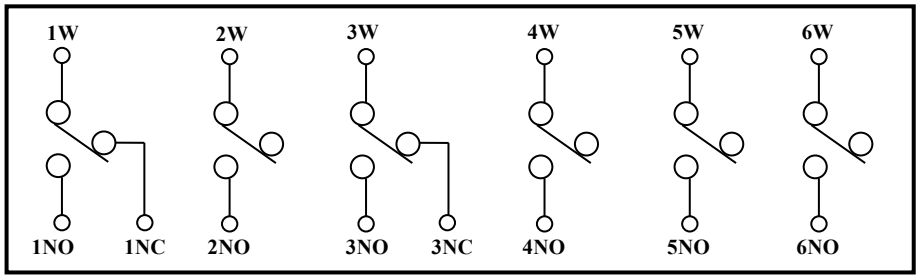
The specification for the IO board is as below:

Function	Min	Norm	Max
Current Range Per Connection (A)	-	-	2A
Output Update Time (ms)	20mS	20ms	20mS
Input Update Time (ms)	20mS	20ms	40mS
Power Supply Voltage Tolerance (5/24V, %)	-10%	0	+10%

6.5.2) Relay Power Board

Fig 6.13





The Relay Power Board may be used to provide extra programmable outputs as required (e.g. extra door operator outputs or Hall Lantern volt free outputs, etc.) Output connections are shown above: All contacts are volt free, rated up to (5A@30Vd.c.) / (8A@250Va.c.); and may be used in safety critical circuits.

Relay Outputs (LED indication is provided and illuminated when the output is asserted):

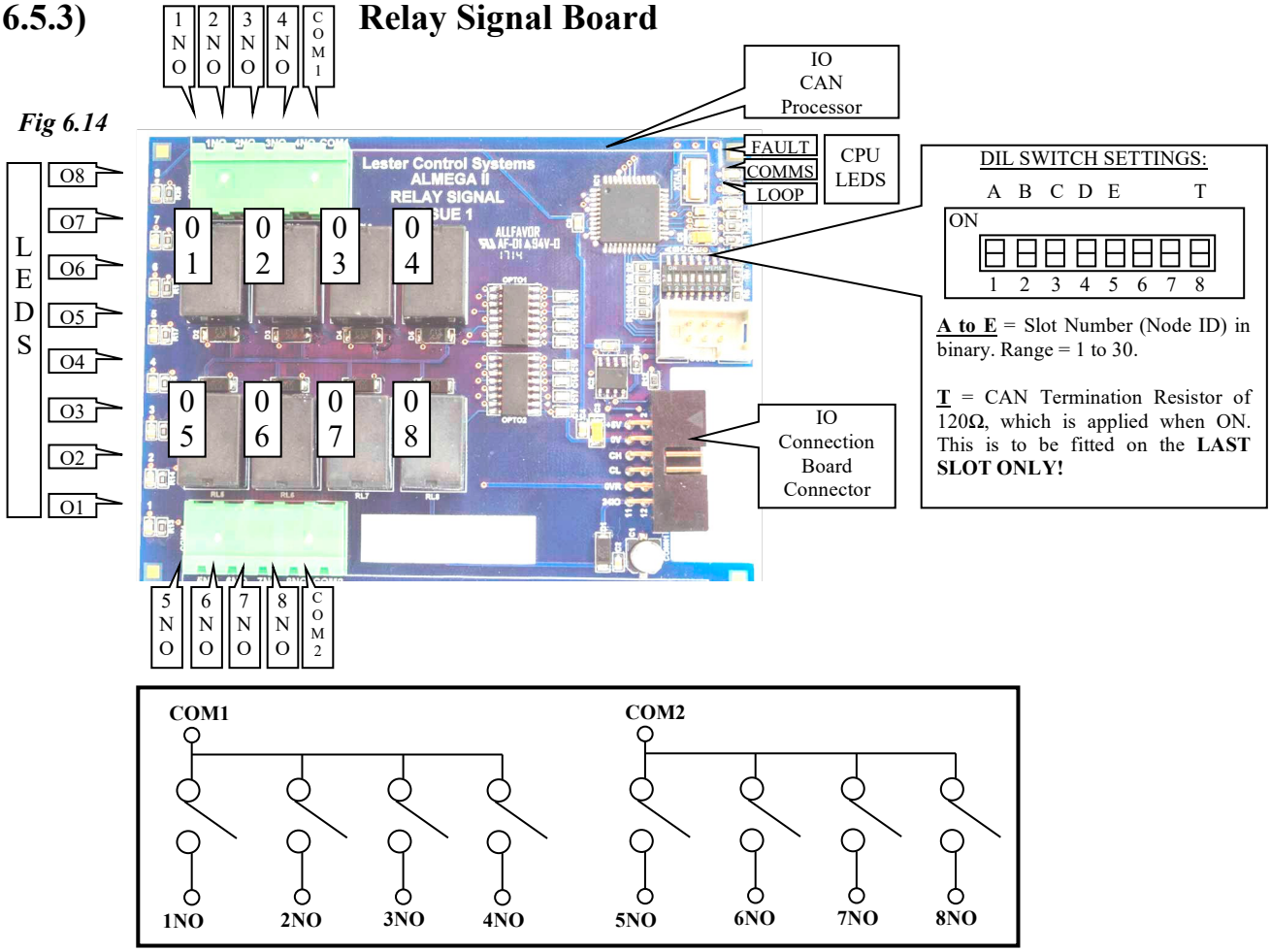
OUTPUT	FUNCTION
1W	Output 1 Common (Wiper)
1NO	Output 1 Normally open
1NC	Output 1 Normally Closed
2W	Output 2 Common (Wiper)
2NO	Output 2 Normally open
3W	Output 3 Common (Wiper)
3NO	Output 3 Normally open
3NC	Output 3 Normally Closed
4W	Output 4 Common (Wiper)
4NO	Output 4 Normally open
5W	Output 5 Common (Wiper)
5NO	Output 5 Normally open
6W	Output 6 Common (Wiper)
6NO	Output 7 Normally open

LED indication is provided for the **CAN PROCESSOR**, functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
LOOP	Processor Program Loop	2 Times a second approx
COMMS	CAN Communication Activity	Once a second approx
FAULT	CAN Fault / Warning	On when Fault, flashes every 20ms when Warning.

6.5.3) Relay Signal Board

Fig 6.14



The Relay Signal Board may be used to provide extra programmable outputs as required (e.g. position / direction / status signals for an external indicator interface). The relays are designed to switch low voltage and low current.
Output connections are shown above: Contacts are volt free connected to 2 common terminals. The contacts are rated up to (3A@24Vd.c.) / (3A@120Va.c.), with a minimum switching capacity of 1mA@1VDC.

Relay Outputs (LED indication is provided and illuminated when the output is asserted):

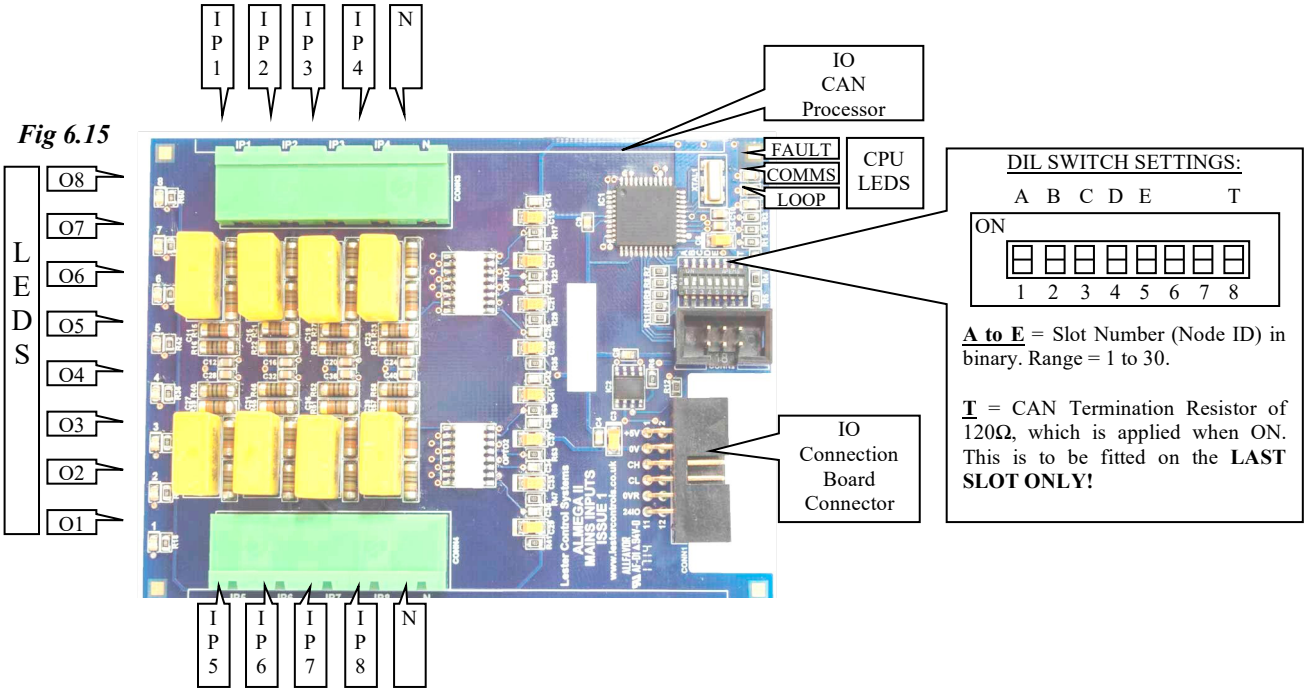
OUTPUT	FUNCTION
COM1	Common Connection 1(Wiper of Relays 1-4)
1NO	Output 1 Normally open
2NO	Output 2 Normally open
3NO	Output 3 Normally open
4NO	Output 4 Normally open
COM2	Common Connection 2(Wiper of Relays 5-8)
5NO	Output 5 Normally open
6NO	Output 6 Normally open
7NO	Output 7 Normally open
8NO	Output 8 Normally open

LED indication is provided for the **CAN PROCESSOR**, functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
LOOP	Processor Program Loop	2 Times a second approx
COMMS	CAN Communication Activity	Once a second approx
FAULT	CAN Fault / Warning	On when Fault, flashes every 20ms when Warning.

6.5.4) Mains Inputs Board

Fig 6.15



The Mains Input Board may be used to provide extra programmable inputs as required (e.g. slowing limits / door edge devices / load weighing signals etc). The inputs may be used in safety critical circuits.

110V AC Inputs (LED indication is provided and illuminated when input is asserted):
Terminal **N** = Neutral / Common return.

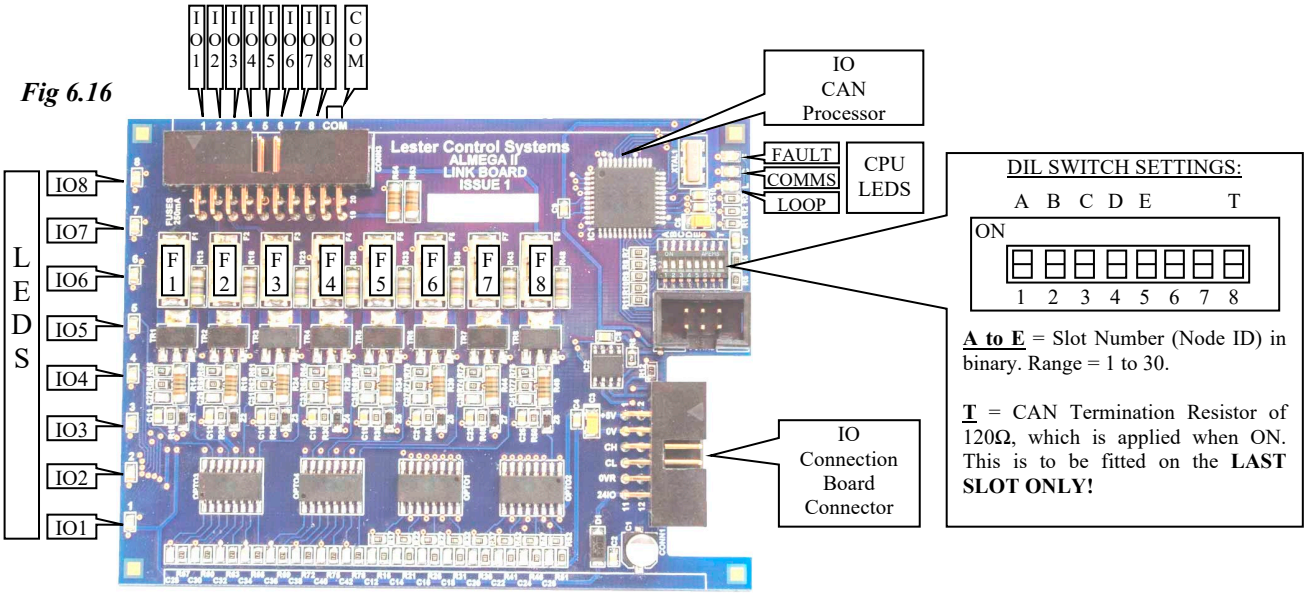
INPUT	FUNCTION
IP1	Input 1
IP2	Input 2
IP3	Input 3
IP4	Input 4
IP5	Input 5
IP6	Input 6
IP7	Input 7
IP8	Input 8

LED indication is provided for the **CAN PROCESSOR**, functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
LOOP	Processor Program Loop	2 Times a second approx
COMMS	CAN Communication Activity	Once a second approx
FAULT	CAN Fault / Warning	On when Fault, flashes every 20ms when Warning.

6.5.5) 24V Link Board

Fig 6.16



The 24V Link Board may be used to provide programmable inputs / outputs as required (e.g. car and landing calls, special service inputs, special function outputs etc). Each IO may only be configured as an input or output, **not both**!

LED indication is provided and illuminated when input or output is asserted; also each IO has an associated fuse of 250mA): Common return = **COM (which is typically wired to EARTH)**.

I/O	FUNCTION
IO1	Input / Output 1
IO2	Input / Output 2
IO3	Input / Output 3
IO4	Input / Output 4
IO5	Input / Output 5
IO6	Input / Output 6
IO7	Input / Output 7
IO8	Input / Output 8

LED indication is provided for the **CAN PROCESSOR**, functions as below:

LED	FUNCTION	FLASH SPEED / FUNCTION
LOOP	Processor Program Loop	2 Times a second approx
COMMS	CAN Communication Activity	Once a second approx
FAULT	CAN Fault / Warning	On when Fault, flashes every 20ms when Warning.

6.6) Input / Output Specifications

The input specification range for an 110V AC input is as below:

Input Function	Min	Norm	Max
Voltage Range @21°C (V-AC)	67V	110V	135V
Update / Scan Time (ms)	20mS	40ms	40mS
Time Response Input On (ms)	10ms	10ms	20ms
Time Response Input Off (ms)	20ms	20ms	28ms

The input specification range for a 24V input is as below:

Input Function	Min	Norm	Max
Voltage Range @21°C (V-DC)	15V	0V	28V
Update / Scan Time (ms)	20ms	20mS	40mS
Time Response Input On (ms)	3µs	3µs	5µs
Time Response Input Off (ms)	144µs	186µs	220µs

The input specification range for the ST/DZ input is as below:

Input Function	Min	Norm	Max
Voltage Range @21°C (V-DC)	15V	0V	28V
Update Time (ms)	1ms	1ms	1ms
Time Response Input On (ms)	3µs	3µs	5µs
Time Response Input Off (ms)	34µs	46µs	76µs

The output specification range for a Power Relay output is as below:

Output Function	Min	Norm	Max
Voltage Range @21°C (V-DC)	18V	24V	28V
Update / Scan Time (ms)	20ms	20ms	20ms

6.6) Power Supply Specifications

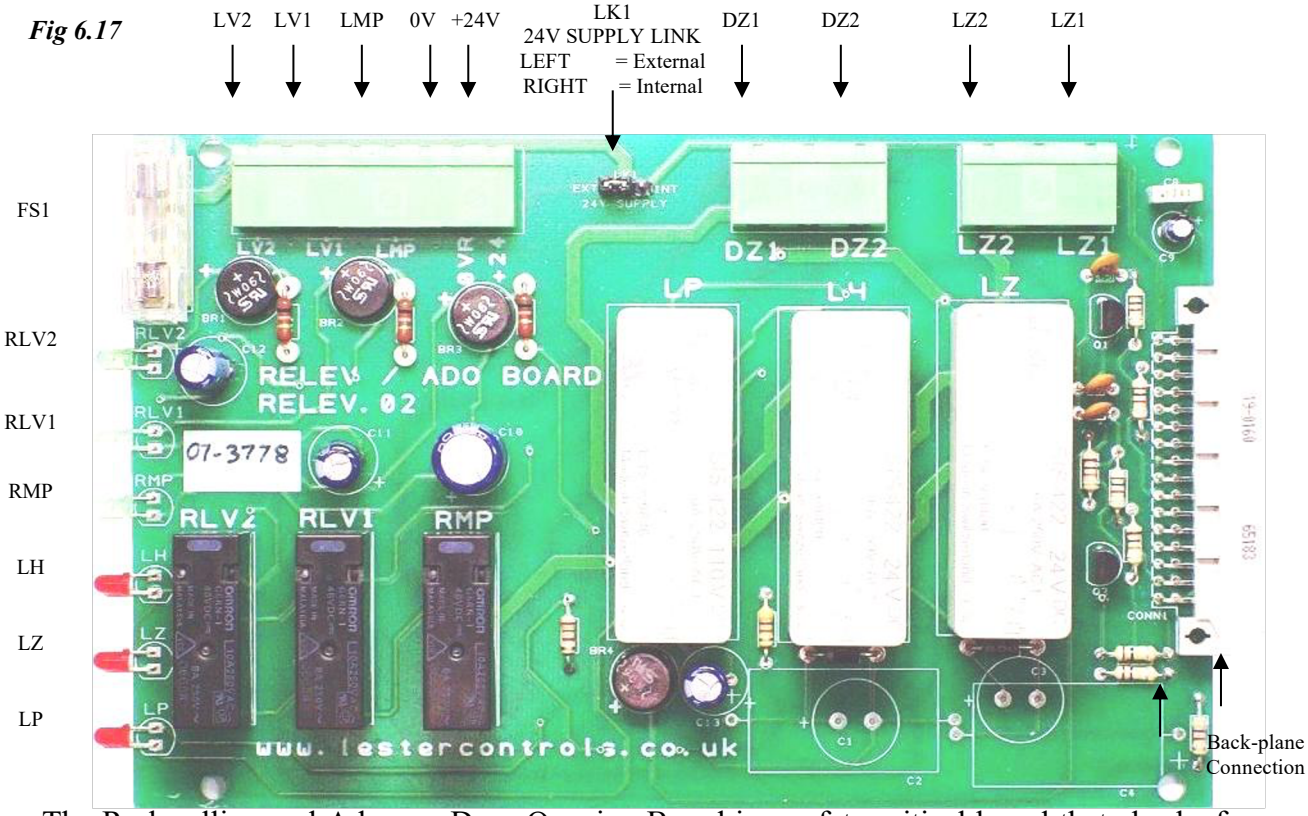
The specification range for Output Voltage against Load Current is as below:

Input Function	Min	Norm	Max
24V Regulated Power Supply	22V (@ 5A output)	24.8V (@ 0.5A output)	25.2V (open circuit)
5V CPU Power Supply	4.85V (@ 1A output)	5V (@ 0.1A output)	5V (open circuit)
5VC (Communications) Power Supply	4.85V (@ 1A output)	5V (@ 0.1A output)	5V (open circuit)
5VIO (Input / Output) Power Supply	4.61V (@ 3A output)	5V (@ 0.1A output)	5V (open circuit)

6.7) Re-Levelling and Advance Door Opening Board

(See also Re-Levelling and Advance Door Open Control)

Fig 6.17



The Re-levelling and Advance Door Opening Board is a safety critical board that checks for correct vane information (also stuck vanes) and ensures that safety circuits (car / landing lock circuits) are only bridged, when the conditions are correct. The safety critical board in conjunction with the physical shaft vane information (re-level proximity vanes), is designed to conform to BS/EN81 standards.

LK1 = supply source i.e. “internal = from backplane”, or “external = terminals”

Inputs

LV1 = Re-level / ADO sensor 1 (1st sensor - tape-head / proximity switch-110VAC)
LV2 = Re-level / ADO signal 2 (from micro processor re-level / ado output-110VAC)
LMP = Re-level / ADO pilot input from micro processor (110VAVC).
0VR = Supply Return for +24V supply (stand alone mode only)
+24V = +24V D.C supply (60mA max) (stand alone mode only)

Outputs

LZ1-LZ2 = Level Zone: n/o Contact (6A@250VAC) for bridging lock safety circuit.
DZ1-DZ2 = Door Zone: n/o Contact (6A@250VAC) to be wired into a processor input for feedback or in Series with Door Open Contactor circuit.

LED Indication

RLV1-2/RMP = Indication for relay coils RLV1, RLV2, and RMP respectively.
LH/LZ/LP = Indication for relay coils LP, LZ, and LP respectively.
Note when locks are bridged LED’s RLV2, RLV1, RMP, LH and LZ should all be lit.

Protection FS1= Fuse protection for +24V supply input (internal or external, 250mA Q-blow)
The Back-plane Connection provides both Power and Board Identification.

7) Fault Finding and Callouts

The microprocessor and circuitry can help the engineer in fault finding because it remembers each fault in turn, which floor it was at, how many times it has occurred and the date and time it happened. See **Event History** (or by pressing MENU key on the keypad) in the main menu for the events and their descriptions. See also **Lift Viewer** and **Input Output Viewer** for detailed information of the lifts' status.

Typical Checking procedure

1) Check the 3 phase incoming supply to the controller.
2) Check motor overloads/circuit breakers etc.
3) Check the various voltages at the Primary and Secondary of each transformer with respect to their terminals and not earth.
4) Check the LED indication associated with each fuse on the power supply (see Power Supply) and the voltage going into and out of each fuse in the control panel, making sure they match and visually inspect where possible for a blown fuse. Avoid switching off if possible to check fuses as this may clear the problem, but it may return at a later date causing another callout.
5) Input **EMER** = Safety Circuit should be on within the IO rack, if not check live feeds in order to terminals (**OTL - OSG - PSW - G1 - G2**), for a Hydraulic Lift, and (**OTL - OSG - G1 - G2**), for a Traction Lift.
6) Input **CARL** = Car Lock Circuit should be on within the IO rack, if not check live feeds in order to terminals **G2** and **G3**.
7) Input **LANL** = Landing Lock Circuit should be on within the IO rack, if not check live feeds in order to terminals **G3** and **G4**.
8) Check through the following functions, identifying correctly ON or OFF as required:
   a) **OSI** output, should be OFF
   b) **TEST** input, illuminated on Normal, OFF on TEST.
   c) **LW90** input**, LW110** input **& OLI** output, illuminated when the lift is 90% or 110% loaded.
   d) **THERM**, illuminated when the motor or machine room thermistor has tripped.
   e) **RET1, 2 or 3**, illuminated when on Emergency Recall/Shutdown 1, 2 or 3.
   f) **SHUTDOWN**, illuminated when on Shutdown Control.
   g) **SERV**, illuminated when on Service control.
   h) **FIRE**, illuminated when on Fire Control.
   i) **HYD OTL** input, illuminated when Hydraulic lift has over travelled.
   j) **PTT Control,** Prepare To Test within processor, and should be OFF.
   k) **SE, DOP** and **DE** are illuminated when the Safe edge, Door open Button and Door Detector Edge are activated respectively, which may prevent the doors from closing.
   l) The **Thermistor and Phase Sequence** LED'S on the phase failure and reversal relay (**PFRR**) must not be illuminated.

If all circuits appear to be O.K, there is a possibility of a coil burning out on a relay, contactor, the brake, ramp or a valve coil may have burnt out. If further help is required whilst fault finding, please make a note of the following before contacting Lester Control Systems.

i) LED's that are illuminated,
ii) A full report of the state of the contactors and relays etc.
iii) A full report of the lift fault.
iv) A full report from the fault logger.

7.1) Common Faults

Detailed below, is a list of common faults. To assist with fault finding see **Event History** in the main menu for the events and descriptions, see also **Lift Viewer** and **Input Output Viewer** for detailed information of the lifts' status.

A) Lift car out of step with the controller
i) Stepping input STEP/DZ must pulse once ON and once OFF between every floor.
ii) Check Tapehead unit/floor selection switches operate correctly.
iii) Check car/landing calls are being entered to the correct floors.

B) Doors remain open and will not close
i) Check safe edge, door open button and detector edge are not operated.
ii) Check door open limit has operated.
iii) Check the LCD display is not reporting Door Open Protection Timeout Fault.
iv) Check that the parameter "PARK OPEN" within **Door Setup** has not been set.
v) Check Terminal limits.
vi) Check Pre-Flite check has not failed, i.e. locks are short circuited, whilst on the door open limit.
vii) Note under Fire control, Service control, and 90% overload bypass the lift doors remain open typically and will only close by initiating a car call.

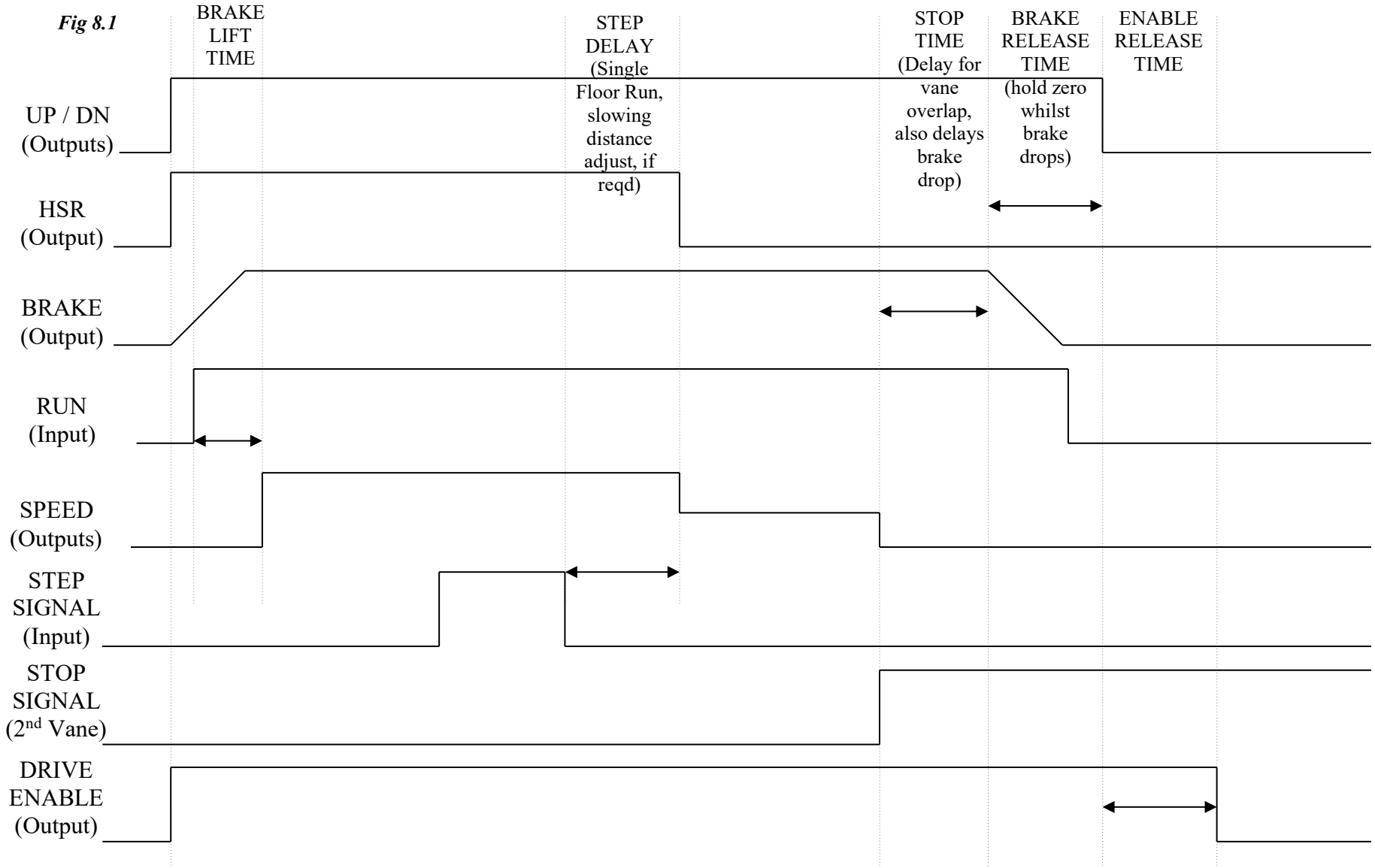
C) Doors closed and will not open
i) Check Stopping vanes STU and STD are not both on from start of a journey until the end of the journey (i.e. Stuck On).
ii) Check Stepping input STEP/DZ is not on from start of a journey until the end of the journey (i.e. Stuck On).
iii) Check lift is stopping on at least one Stopping vane when at floor level (STU or STD), however both are required for correct operation i.e. (STU and STD).
iv) Check that the parameter "DISABLE DOORS" within **Door Setup** has not been set.

D) Doors closed lift will not run
i) Check car and landing locks are made LED's **EMER** and **CARL and LOCK** on the CPU board.
ii) Check door limits.
iii) Check shaft Terminal limits.
iv) Check any drive fault conditions.
v) Check Phase Failure (PFRR) and Thermistors have not tripped.

E) Lift stops in travel
i) Car or Landing Lock "tipped".
ii) Journey timer operated.
iii) Run signal feedback fault i.e. input RUN.
iv) Slowing switch incorrectly set.
v) Lift slowed and stopped in mid travel, Tapehead/Proximity switch malfunctioning or set incorrectly.

8) Microprocessor Drive & Stopping Sequence

Fig 8.1



Above shows a typical Drive and Stopping Sequence, highlighting the main parameters for Speed, Stepping and stepping control that the ALMEGA 2 2 can provide.

9) Lift Special Services Operation

Prepare To Test:
The prepare to test feature is enabled through the Engineers Selection menu, or through Special Service2 parameter Setup. This feature has the effect of preparing the lift for full test control by inhibiting any further landing calls, preventing the lift from homing to the main floor, and picking up any further passengers. Any passengers remaining in the lift will still be able to register car calls to their destination. Options are given for disabling the doors and low speed timer whilst on Prepare to Test.

Service Control:
The Service Control Feature is selected by asserting the **SERV** input. When selected, the service control feature renders the lift out of service and transfers all landing calls to other members of the group (if any). The control of the lift is then from the car only, and it is assumed that an attendant would operate the lift in a manual fashion as the car call buttons now become constant pressure buttons. The advantage of such control is for the loading and unloading of goods whereby the attendant has full control of the lift e.g. a porter in a Hotel. Parameters found in **Special Service2 Setup** provide options for enabling/disabling constant pressure door control.

Fire Control:
The Fire Control feature is selected by asserting the **FIRE** or **FIRE2** input. When selected, the fire control feature renders the lift out of service and transfers all landing calls to the other members of the group (if any). There are many different types of Fire control but generally the lift is interrupted from its normal direction of travel to its destination (any car calls being immediately cancelled) and called automatically to a specific floor as a matter of urgency for a fireman. Once the lift has reached this floor, full control of the lift and the doors is assigned to the fireman via constant pressure call buttons and the door open button. Parameters found in **Fire Control Setup** provide options for enabling/disabling constant pressure door control and selecting fire floor etc. Two inputs **FIRE** and **FIRE2** are provided to allow the lift to return to 2 different fire floors.

Fire Alarm Control:
The Fire Alarm Control feature is selected by asserting the **FAR1** or **FAR2** inputs. When selected, the fire alarm control feature renders the lift out of service and transfers all landing calls to the other members of the group (if any). The lift is interrupted from its normal direction of travel to its destination (any car calls being immediately cancelled) and called automatically to a specific floor as a matter of urgency. Once the lift has reached this floor, the doors are parked closed (as default). Parameters found in **Fire Control Setup** provide options for door control and selecting the return floors etc. Two inputs **FAR1** and **FAR2** are provided to allow the lift to return to 2 different fire floors.

Evacuation Control:
The Evacuation Control feature is selected by asserting the **EVACUATION** input. When selected, the Evacuation control feature renders the lift out of service and transfers all landing calls to the other members of the group (if any). The lift is interrupted from its normal direction of travel to its destination (any car calls being immediately cancelled) and called automatically to a specific floor as a matter of urgency. Once the lift has reached this floor, full control of the lift and the doors is assigned to the operator via constant pressure call buttons and the door open button. Evacuation control is intended to assist in the evacuation of persons in a building by providing information to an operator within the lift car of persons waiting on a landing. This information may be conveyed using an intercom system or from persons pressing the landing call buttons. A user on the landing presses a landing call button, which in turn flashes the car

call acceptance illumination within the car. The operator within the lift car may then pick up passengers and take them to an evacuation point (floor), in an orderly fashion as described by the buildings evacuation procedure. Knowledge of passengers waiting is indicated by the flashing car call acceptance illumination. The operator enters a car call to pick up passengers from the destination. The car call illumination then stays on permanently to indicate the car call has been accepted, it will completely extinguish when the call is answered. Parameters found in **Fire Control Setup** provide options for enabling/disabling constant pressure door control, selecting the return floor, enabling the flashing of car calls when a landing button is pressed etc.

Load Weighing 110% Overloaded:
The 110% overload function becomes active when the lift is stationary (during travel has no effect) and the **LW110** input is asserted. The event 110% overload is generated, doors are parked open, and the lift is then marked out of service.

Load Weighing 90% Overload/Bypass:
The 90% overload function is active when the lift is either moving or stationary and the **LW90** input is asserted. The operation of the lift changes such that landing calls are bypassed, therefore reducing the chance of another person entering the lift and fully overloading it. Instead car calls are only answered, so that passengers will leave the lift car thus reducing the weight and relieving the 90% overload condition. Once this is achieved landing calls are resumed and the lift is ready to pick up passengers once again as normal.

Thermistor Tripped:
The Thermistor Tripped function becomes active when the lift is stationary and the **THERM** input is asserted. The event Thermistor Tripped is generated, doors are parked open, and the lift is then marked out of service.

Priority Service Controls (1,2&3):
The Priority Service Control Features are selected by asserting the **PRIORITY SERVICE 1/2/3** inputs as required. When selected, the lift is rendered out of service and transfers all landing calls to other members of the group (if any). The lift is interrupted from its normal direction of travel to its destination (any car calls being immediately cancelled) and called automatically to a specific floor as a matter of urgency. Once the lift has reached this floor, full control of the lift is assigned to the user. Parameters found in **Special Service Setup** provide options for enabling/disabling constant pressure door control, enabling/disabling car calls etc.

Shutdown Control:
The Shutdown Control Features are selected by asserting the **SHUTDOWN** input as required. When selected, the lift is rendered out of service and transfers all landing calls to other members of the group (if any). The lift may be interrupted from its normal direction of travel to its destination (any car calls being immediately cancelled) and called automatically to a specific floor as a matter of urgency. Parameters found in **Special Service2 Setup** provide options for return controls (i.e. return floor), enabling/disabling constant pressure door control, enabling/disabling car calls etc.

Automatic Service:
Automatic Service Control is selected by asserting the **AUTOMATIC SERVICE** input as required. When selected, the lift is rendered out of service and transfers all landing calls to other members of the group (if any). Automatic service can be used for a variety of applications e.g. lift floor to floor testing, and Automatic control that requires no human interaction of pressing call buttons. The lift will run continuously in an automatic fashion answering one single car call

at a time. The lift can be configured to answer calls in the UP, DN, or both directions. The frequency of operations is measured in starts per hour (parameter settable). The number of starts per hour should not exceed the rated motor starts per hour. Parameters found in **Special Service1 Setup / Special Service Times** provide options for clearing calls upon operation of the switch; park open door control, enabling/disabling car calls, and landing call re-open etc.

Hospital Priority Service "Code Blue":

Hospital Priority Service "Code Blue" has been designed to work in a hospital environment allowing personnel a dedicated and custom priority service.

Code Blue Control is selected by asserting code blue inputs as required. An extra set of landing pushes are therefore required. Code Blue priority calls are entered at the landing entrances via a momentary action key-switch. Upon receipt of the call, the lift is rendered out of service and transfers all landing calls to other members of the group (if any), and makes an immediate return to the floor where the call was made. In the event the lift has to reverse its direction to the call, the lift will slow and stop at the next available landing before returning.

Upon arrival at the landing, the lift will remain on Code Blue control for a period of typically 15 seconds (parameter settable). This is to allow the user time to take control of the lift, otherwise after this time period the lift will return to normal operation, or answer the next Code Blue call (if any). Control is taken by putting the lift in the state of "Code Blue Held", this is achieved by asserting an input (i.e. Service Control or the "code blue hold" input (if configured)), or alternatively a call before the timeout times when "Code Blue Hold Bypass" parameter is set to YES. Once control is established the user may take the lift to its desired destination via the entering of car calls. Switching back to normal operation; requires the release of "code blue held", i.e. switching off the input or waiting for the timer to time out.

Code Blue control can be achieved by various methods, i.e. within a group of lifts whereby Code Blue calls are shared and dispatched to the nearest lift(s). Otherwise an isolated lift within the group may be configured for Code Blue control only (i.e. independent operation).

A Multiple calls option allows multiple code blue return calls to the same floor, e.g. if a lift has been called to a floor, another lift would **not** normally be allowed to be called to the same floor until the existing one has gone. However the multiple calls option allows another lift to be called whilst the existing one is still there. Note two or more lifts will not return at the same time to the same floor, only one. However two or more lifts may be returning to two or more different floors at the same time.

Parameters found in **Special Service2 Setup / Special Service Times** provide options for enabling/disabling constant pressure door control; park open door control, independent control, allowing multiple calls, and code blue hold / dwell times etc.

Code Blue, some General Points:

i) Lift(s) answer calls in the order of 1st come 1st served.
ii) If a call is not answered in the allotted time, the lift times out, the allocation is un-assigned, and another lift may take the call if available.
iii) Code Blue priority calls are answered upon a successful return.
iv) If no lifts are available, calls are cleared after a specified time period.

10) Lift Self Test Operation

The self test feature automatically inserts terminal floor car calls (i.e. Top and Bottom or settable via parameters) typically 120 seconds after lift inactivity following a fault condition, e.g. door open/close protection time, lock failure, failure to start etc. This cycle will be repeated every 120 seconds up to a maximum of ten attempts (parameter settable) or until the lift is back in service. After the last attempt, self test will be inhibited until the system is returned to normal operation via passenger intervention. Events will be generated indicating a self test to Top or Bottom, and whether or not the self test Passed or Failed. Parameters found in **General Parameters and General Times** provide options for Self Test as below:

General Parameters:

Parameter	**Min**	**Max**	**Default**
Self Test	NO	YES	YES
Number of Self Tests	1	10	5
Self Test Bottom Floor	Bottom Floor	(Top Floor-1)	Bottom Floor
Self Test Top Floor	(Bottom Floor+1)	Top Floor	Number of Floors

General Times:

Parameter	**Min**	**Max**	**Default**
Self Test Time	0s	600s	120s

11) Out Of Service Setup

The Out Of Service output **OSI** can be configured as required via the parameters found in the **Out Of Service Setup.** A list of failures and service modes can be selected / de-selected. Also by setting the parameter INVERT OSI INDICATOR (Lift in Service Indicator) in **General Parameters** the Out of Service Indicator is inverted and becomes a Lift in Service Indicator. A selection of parameters are shown below.

OSI Indicator:

Parameter	**Min**	**Max**	**Default**
Error in Position	NO	YES	YES
Journey Timer timed	NO	YES	YES
Hydraulic Overtravel	NO	YES	YES
Start Failure	NO	YES	YES
Re-Levelling Error	NO	YES	YES
Door Open Protection	NO	YES	YES
Door Close Protection	NO	YES	YES
Landing Lock Failure	NO	YES	YES
Car Lock Failure	NO	YES	YES
Lift Motion Failed	NO	YES	YES
Inspection Control	NO	YES	YES
Etc.	..	..	..

12) Lift Anti Nuisance Control

Anti-Nuisance features have been included to enhance the operation of the system and help reduce waiting times. All features are configurable by the parameters in the **Anti Nuisance Setup** but typical values are given below. Also the features described below are all disabled during any not-normal service operations, i.e. Fire and Service control.

Reverse Car Call Dumping:
When the lift slows for its last call in the established direction of travel then reverse car call dumping is established. Reverse car call dumping causes the cancellation of reverse direction car calls if typically 3 or more car calls exist.

Forward Car Call Dumping:
If the lift has arrived at typically 3 or more destinations without breaking the detector edge/light ray, and there are typically 3 or more car calls still remaining, then these remaining calls will be cancelled (dumped).

Door Open Push Held Car Call Dumping:
The remaining car calls will be cancelled and the event "**OPEN PUSH HELD**" will be recorded when the door open push has been held constantly for more than typically 20 seconds.

Safe Edge Held Car Call Dumping:
The remaining car calls will be cancelled and the event "**SAFE EDGE HELD**" will be recorded when the safe edge has been held constantly for more than typically 20 seconds. However this is not active when the door nudging control is enabled.

Detector Edge / Light Ray Override:
If the detector edge / light ray has been held for more than typically 20 seconds the event "**DETECTOR EDGE OVERIDE**" will be recorded and the lift doors will close regardless of the detector edge input. However this is not active when the door nudging control is enabled.

Stuck Hall Push Detection:
The " **STUCK UP LAN BUTTON** ", and " **STUCK DN LAN BUTTON** " events (UP and DOWN landing call buttons) will be recorded typically 10 seconds after the microprocessor has attempted and failed to cancel the respective hall call. The respective stuck hall call is now ignored but will be eligible for operation after the stuck condition has been removed. However, to provide lift service to the floor with the stuck hall push or pushes, the microprocessor will reinstate the call (if still stuck), typically 240 seconds from when originally detected.

Stuck Car Push Detection:
The " **STUCK CAR BUTTON** " event will be recorded typically 10 seconds after the microprocessor has attempted and failed to cancel a car call. The stuck car call is now ignored but will be eligible for operation after the stuck condition has been removed. However, to provide lift service to the floor with the stuck car call push, the microprocessor will reinstate the call (if still stuck), typically 240 seconds from when originally detected.

Landing Call Door Reversal Inhibit:
This feature is usually invoked on group systems whereby it is necessary to limit the number of door reversals when a landing call is pressed. This ensures the lift is not held at a floor un-necessarily thus increasing waiting times. The feature is invoked when the lift has calls in the system to a destination. The number of door reversals, are limited to between 1 and 10.

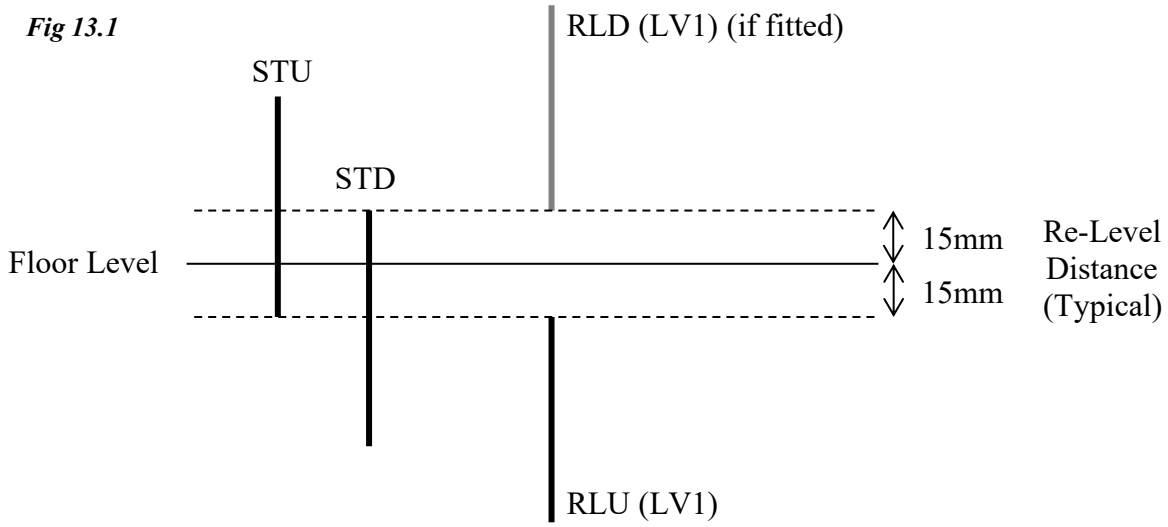
13) Lift Re-Levelling

(See also Re-Levelling and Advance Door Opening Board)

Lift re-levelling control is achieved using the combination of software, and a safety critical Re-Levelling / Advance Door Opening Board. The software provides functionality by analysing vane information, producing outputs to re-level, checking for stuck vanes, reporting and acting upon error conditions etc, whereas the safety critical board, checks for correct vane information (also stuck vanes) and ensures that safety circuits (car / landing lock circuits) are only bridged, when the conditions are correct. The safety critical board in conjunction with the physical shaft vane information (re-level proximity vanes), is designed to conform to BS/EN81 standards.

13.1) Re-Levelling Vane Layout Using Tape Head / Shaft Switches

Fig 13.1



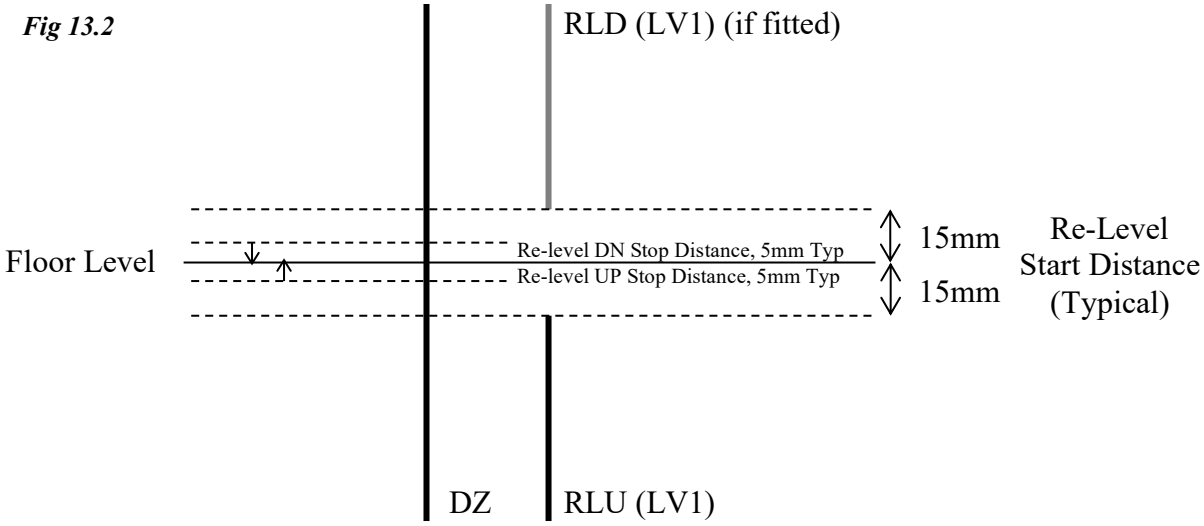
The Lift will re-level within the re-level distance (as shown). The distance may be varied to be smaller or larger (as required). However if it is too small instability / errors may occur, also if it is too large, the step between the lift car and landing entrance may be excessive before it re-levels. Overlap between re-level vanes and stopping vanes at the re-level point is not necessary since it requires both LV1 to energise and STU to release, to start re-levelling in the up direction for example. The order of the vanes is not important, however for predictable operation, setting both vanes the same distance is recommended.

Re-Level Up Sequence

1. Lift sinks onto RLU, and at (or about) the same time comes off the trailing edge of STU.
2. The micro processor initiates the start sequence by energising the re-level output.
3. The re-level output signals the re-level board to bridge the lock circuit.
4. The micro processor monitors the lock circuit and a feedback contact from the re-level board before energising the UP relay and other associated controls.
5. Re-levelling Up now commences.
6. The micro processor monitors the vane information and re-levelling starts to terminate upon release of RLU. (If a fault occurs, re-levelling may be terminated for various other conditions.)
7. A delay off timer set by parameter RELEV_UP_STOP_TIME determines the re-level distance and ultimately the floor level after re-levelling.
8. The micro processor performs a final check to ensure the re-level board feedback contact has released.

13.2) Re-Levelling Vane Layout Using Positioning System

Fig 13.2



The Lift will re-level within the start re-level distance (as shown). The distance may be varied to be smaller or larger (as required). However if it is too small instability / errors may occur, also if it is too large, the step between the lift car and landing entrance may be excessive before it re-levels.

Re-Level Up Sequence

1. Lift sinks onto RLU.
2. The micro processor initiates the start sequence by energising the re-level output.
3. The re-level output signals the re-level board to bridge the lock circuit.
4. The micro processor monitors the lock circuit and a feedback contact from the re-level board before energising the UP relay and other associated controls.
5. Re-levelling Up now commences.
6. The micro processor monitors the lift position and re-levelling starts to terminate when the Re-level Up stop distance is reached (typically 5mm).
7. The Re-level Up stop distance should be set according to the distance it takes the lift to stop during re-levelling (i.e. for the Hydraulic operation to ramp from re-level speed to zero speed).
8. If the lift overshoots floor level (>=5mm), the events below will be generated:
    1. RELEV RUN FAULT UP
    2. RLEV OVERSHOT FLR LEV

    These could be due to the Re-level Up stop distance which needs increasing or the RLU (LV1) vane which is set too near floor level (<15mm below floor level).
9. A delay off timer set by the parameter RELEV_UP_STOP_TIME also terminates re-levelling as a backup, set at 3000 Milliseconds typically.
10. The micro processor performs a final check to ensure the re-level board feedback contact has released.

13.3) Hydraulic Normal Stopping Sequence

The stopping sequence during normal operation has an effect on the re-levelling setup regarding vane setup, vane overlap, and ultimately re-levelling distance. Related parameters set within the factory will suit most installations, but an appreciation of this could be regarded as necessary. The UP stopping sequence is divided into 2 stages, and applies to Hydraulic systems which:

1. Release the valves firstly then the pump.
2. Release the pump first, then the valves.

Stopping Sequence (valves 1st, pump 2nd)		Stopping Sequence (pump 1st, valves 2nd)
i)	Stopping point is reached.	Stopping point is reached.
ii)	Stop timer, starts timing	Stop timer starts timing.
iii)	Stop timer timed?	Stop timer timed?
iv)	**Release Valve (UP pilot relay).**	**Release Pump (UP pilot relay).**
v)	Enable release timer, starts timing.	Enable release timer, starts timing.
vi)	Enable timer timed?	Enable timer timed?
vii)	**Release Motor (Enable pilot relay).**	**Release Valve (Enable pilot relay).**

The pressure within the hydraulic system is applied by the motor in the UP, and is released at the appropriate time in accordance with the valve release sequence. In the DOWN the pressure is applied constantly by the weight of the lift, and the release of the valve determines stopping.

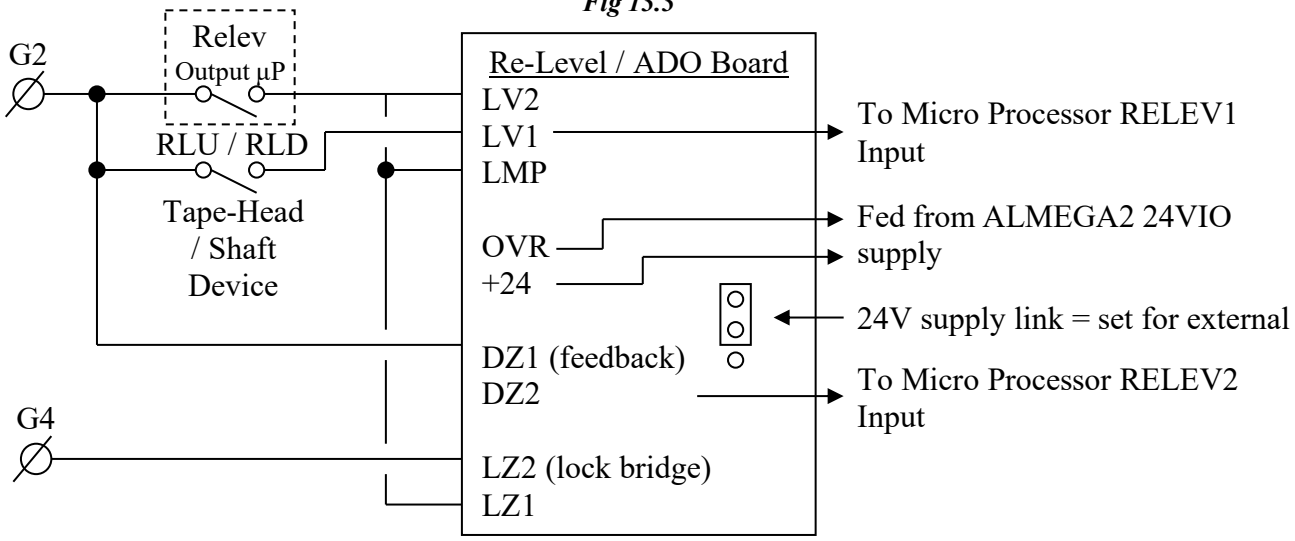
Parameters STOP TIME and ENABLE RELEASE TIME can be found in TRAVEL SETUP from the menu. They are settable in milliseconds (0-3000).

A typical setting for STOP TIME is derived from the levelling speed of the lift and the vane overlap of 15mm. Taking into account distance for the lift to reach zero speed from level speed we may allow 10mm approx. Therefore we need a stop time for the remaining distance of 15-10mm = 5mm). Time to travel 5mm @ 0.06m/s = 5/60 = 83milliseconds.
Therefore typical STOP TIME ≈ 100mS

A typical setting for ENABLE RELEASE TIME that allows pump run on after the valve has released is 500mS. This has the effect of keeping maintaining a constant pressure when the valve closes, and thus should provide a predictable, and softer stop.
Typical ENABLE RELEASE TIME = 500mS

Re-Level IO and Board Interface

Fig 13.3



13.4) Re-Level Warnings

A Re-level Warning is given for the following conditions:

1. Wrong vane sequence (i.e. wrong vane sequence release)
2. Re-level timeout.
    a. Maximum re-level time exceeded.
3. Re-level Lock Bridge faults (check for locks bridged when re-levelling).
    a. Locks not bridged before re-levelling
    b. Lock Bridge removed whilst re-levelling. (If floor level is not reached, re-level timeout will be generated 1st, otherwise lock bridge warning).
4. Re-level board feedback fault.
    a. Feedback contact not made up before re-levelling.
    b. Feedback contact not released after re-levelling.
5. Emergency stop whilst re-levelling (re-levelling terminates, event generated).
6. Re-levelling Pump up / Sunk down control.
    a. If lift sunk down off Stopping vanes STU / STD, and not re-levelled UP.
    b. If pumped /moved up past Stopping vanes STU / STD, and not re-levelled DN.

After a warning, re-levelling is inhibited for 5 seconds, to allow for last run to terminate (i.e. contactors and backup timer to de-energise). After 5 seconds, a recovery call is made to another floor, in an attempt to eliminate conditions specific to the floor that caused the warning i.e. faulty vanes / tight guides etc. The recovery call preference, is to send the lift down a floor, however if this is not possible it will go UP. If the fault is not floor specific, further warnings will be reported until a warning limit is reached. After this warning limit is reached re-level failure is initiated.

The warning level is incremented **(typically by 10)** every time a warning is generated. Otherwise if re-level was successful, the warning level is decremented **(typically by 2)**. The warning level maximum typically set at 30 would allow 3 successive re-level warnings before failure.

13.5) Re-Level Failures

A Re-level failure occurs for the following conditions.

1. Stuck vane / signal
    a. Either LV1 vane, or LV2 signal.
    b. or BOTH.
2. Error warning level exceeds warning limit.
3. Sunk down and unable to recover.
    a. The lift has sunk down and a warning is generated. Normally the lift will attempt a recovery call. However if the lift cannot recover due to conditions such as excessive overload, locks open when constant pressure close doors etc, a re-level failure is generated.
4. Re-level Yoyo Error.
    a. Excessive re-level operations (see yoyo operation)

Under failure any run is terminated, calls are cleared, and an attempt to return the lift to the lowest floor is made. Whereby it stays out of service, until the processor is reset (i.e. power removed / restored).
An exception to this condition is Fire Control whereby the condition is suspended to allow the fireman full control of the lift. After fire operation is complete, the lift will then return and hence stay out of service.

<u>Re-level Yoyo Detection</u>

Re-levelling operations can be monitored, and a fault trigger can be programmed when an excessive amount have been reached. The term yoyo, relates to the “yoyo toy” whereby the motion is a continuous UP / DN. Excessive re-levelling cycles can be due to overheating hydraulic oil or faulty proximity switches etc. Faults such as this (if ignored) may place the lift in a dangerous condition. Programming is achieved by setting the number of yoyo’s allowed within a given time period. Typically this is set at 12 within a 60 minute period. A re-count is made for every minute. If the number of yoyos exceeds these settings, re-levelling is terminated, and the lift is returned to the bottom as described in the re-level failure sequence.

13.6) Re-Level Parameters

Re-levelling parameters are found in Hydraulic setup (not specific to Hydraulic, but generally), and allow typical programming as below:

Re-Level Parameters:

Parameter	Min	Max	Default	Description
RELEVEL REQUIRED	NO	YES	NO	Yes / No switch for re-levelling
MAX RELEV PERIOD	0	10	10	Max time allowed for re-levelling
RELEV YOYO COUNT	1	24	12	Number of Yoyo's within Yoyo period
RELEV YOYO PERIOD(s)	0	120	60	Period for detection of number of Yoyo's
RELEV UP STOP TIME(ms)	0	3000	0	Stop UP delay after re-levelling UP
RELEV DOWN STOP TIME(ms)	0	3000	0	Stop DN delay after re-levelling DN
RECOVERY TIMEOUT TIME(s)	0	180	60	Time allowed for recovery call to be completed
RELEV START TIME(ms)	0	3000	2000	Start delay before re-levelling

Positioning System Parameters:

Parameter	Min	Max	Default	Description
RE-LEV UP STOP DISTANCE(mm)	0	100	5	Up Stopping distance LEVEL to ZERO speed
RE-LEV DN STOP DISTANCE(mm)	0	100	5	Dn Stopping distance LEVEL to ZERO speed

13.7) Re-Level Event Recording

Below is a list of events that will appear in the fault logger if any errors occur with the re-levelling system. Errors will be reported by one or more events during the sequence state, i.e. during Re-level Start, Run, or Stop. The fault may occur for various reasons i.e. Timed (timeout), STU / STD lost, Board Feedback, or Lock Bridge etc. Checking the logger and event sequence will provide useful information in establishing the reason for the fault.

Re-Level Events:

Parameter	Description
EMERGENCY STOP RELEVL	Emergency Stop whilst re-levelling.
RELEV_START_FAULT_UP	Start Fault in the UP direction. Check Re-level board feedback.
RELEV_START_FAULT_DN	Start Fault in the DN direction. Check Re-level board feedback.
RELEV_RUN_FAULT_UP	Run Fault in the UP direction. Check vane seq/timeout/overshoot/yoyo.
RELEV_RUN_FAULT_DN	Run Fault in the DN direction. Check vane seq/timeout/overshoot/yoyo.
RELEV_STOP_FAULT_UP	Stop Fault in the UP direction. Check Re-level board feedback/timeout.
RELEV_STOP_FAULT_DN	Stop Fault in the DN direction. Check Re-level board feedback/timeout.
RELEV_ERR	Re-level Error: warnings exceeded/stuck vanes/re-level board error.
RELEV_YOYO_ERR	Excessive yoyo's within yoyo period time (e.g. >=12 within a minute).
RELEV_HYDOTL_ERR	Lift over-travelled at the top floor.
RELEV_TIMED	Maximum re-level period exceeded (>=10s).
RELEV_STU_STD_LOST	STU/STD Stop Vanes lost when either primed or re-levelling.
RELEV_STU_LOST	STU Stop Vane lost when either primed or re-levelling.
RELEV_STD_LOST	STD Stop Vane lost when either primed or re-levelling.
RELEV_SUNK_DN_ERR	Sunk down and failed to re-level up. Typically vane(s) missing.
RELEV_PUMPED_UP_ERR	"Sprung" up and failed to re-level dn. Typically vane(s) missing.
RELEV_LOCK_BRIDGE	Lock circuit failed whilst re-levelling.
RELEV_BOARD_FEEDBACK	Re-level Board feedback contact failed (starting or stopping).
RELEV_RECOVERY_FAILED	Attempt to move to another floor failed.
RELEV_UNABLE_TO_RECOVER	Unable to move to another floor. Check LW10/Therm/Serv.
RELEV_OVERSHOT_FLOOR_LEV	Lift travelled past floor level. Chk re-level up/down stop distance/LV1.
RELEV_OUT_OF_RLEV_ZONE	Lift not within re-level zone (i.e. door zone, typically 150mm).

13.8) Specific Hydraulic Operations

Hydraulic Homing

Hydraulic homing is a requirement of BS/EN81, relating to "Electrical Anti-Creep (EN81-2-1998:14.2.1.5)" which states that "the car shall be dispatched automatically to the lowest landing, within 15 minutes of the last normal journey".

Therefore, if the lift is idle and not at the bottom floor, the Hydraulic Homing timer will start to expire (typically 10 minutes). When the timer expires, a homing call to the bottom floor is made. If the normal homing floor is programmed to any other floor than the bottom, the lift will first return to the homing floor as programmed, and then Hydraulic home to the bottom after 10 minutes.

Hydraulic Over-travel Detection

Over-travel detection is a requirement of BS/EN81, relating to "Method of operation of final limit switch (EN81-2-1998:10.5.3)" which states that "After the operation of the final limit switch, car movement in response to car / landing calls shall no longer be possible, even in the case of the car leaving the actuation zone by creeping. The return to service of the lift shall not occur automatically (10.5.3.2)".

An input to the microprocessor is specifically reserved for Hydraulic over-travel detection.

Following this condition, and identical to re-level failure, any run is terminated, calls are cleared, and an attempt to return the lift to the lowest floor is made. Whereby it stays out of service, until the processor is reset (i.e. power removed / restored).

An exception to this condition is Fire Control whereby the condition is suspended to allow the fireman full control of the lift. After fire operation is complete, the lift will then return and hence stay out of service.

Thermistor Operation when Hydraulic

When the motor / machine room thermistors have tripped, the lift cannot move in the upwards direction, therefore an attempt to return the lift to the lowest floor is made. Re-levelling is inhibited at this point. The lift stays out of service until the thermistors have reset.

Journey Timer Operation

Journey timer operation is slightly different for Hydraulic lifts, whereby an attempt to bring the lift to the bottom is made before placing the lift out of service. This applies to when the lift was travelling in the UP direction, and not the DN.

If the lift journey timer times in the UP direction, the run is terminated and a journey timer event is reported. An attempt to return the lift to the lowest floor is made. If journey timer times during this run, lift movement is disabled and it stays out of service, until the processor is reset (i.e. power removed / restored).

14) Advance Door Opening

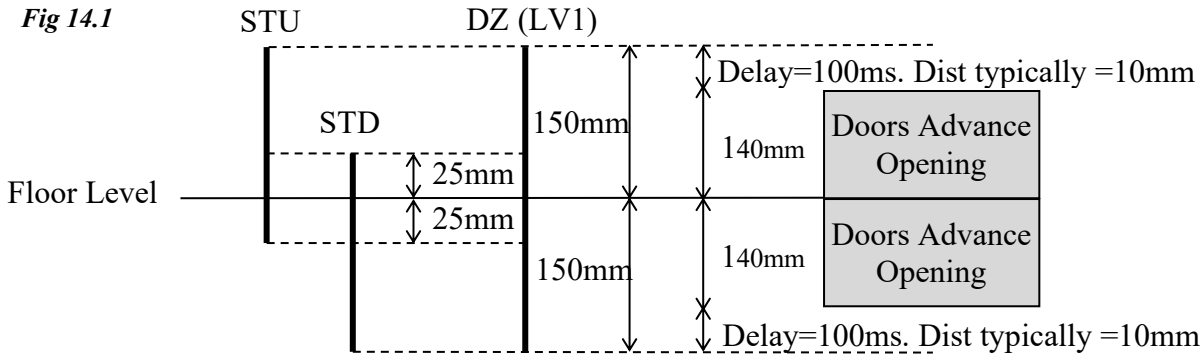
(See also Re-Levelling and Advance Door Opening Board (relev / ado board))

Similar to re-levelling, Advance Door Open control is achieved using the combination of software and a safety critical Re-Levelling / Advance Door Opening Board.
The main differences are below:

1. The vane layout is different (as shown below) whereby the Door Zone is a continuous vane, instead of 2 separate vanes (RLU / RLD).
2. For a traction lift, The STOP TIME is generally greater; hence the vane overlapping distance.
3. An Advance Door Open Output (from the µP) is used instead of a re-level output.

14.1) Advance Door Opening Vane Layout Using Tape Head / Shaft Switches

Fig 14.1



Advance Open Sequence (UP direction)

1. Lift approaches floor level on levelling speed.
2. Vane DZ (LV1) is energised, and at the same time STD. (**Note seeing STD before DZ will generate errors, however the processor allows a tolerance of 10mm approx)**
3. The micro processor starts the sequence by energising the advance open output.
4. The advance open output signals the relev / ado board to bridge the circuit between LZ2 and LZ1 on the re-level / ado board.
5. The micro processor monitors the lock bridge circuit via a feedback contact from the re-level board before starting the ADVANCE OPEN DELAY TIMER.
6. When the ADVANCE OPEN DELAY TIMER times, DOR energises and the doors advance open.
7. The micro processor monitors the vane information and advance opening terminates upon seeing both stop vanes STU / STD. (If a fault occurs, advance opening may be terminated for various other conditions.)

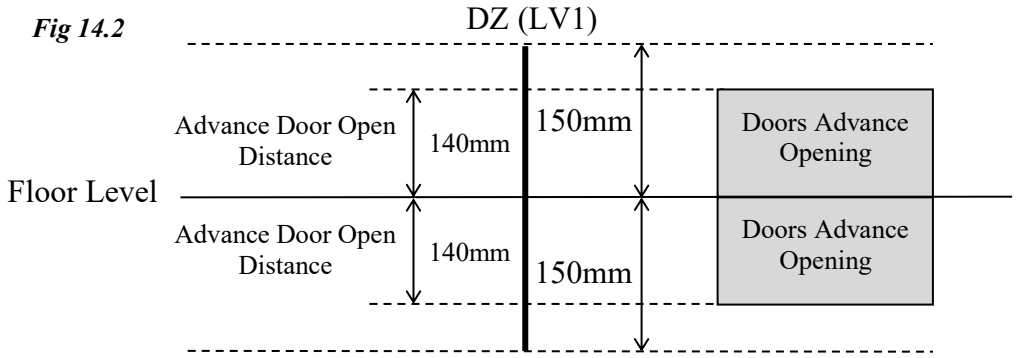
The sequence for DN is almost identical to UP, except the states of STU / STD are substituted.

The parameter "ADVANCE OPEN DELAY" (0-3000ms), found in DOOR TIMES, determines the amount of advance door opening, i.e.

a. Shorter delay = More advance door opening
b. Greater delay = Less advance door opening

14.2) Advance Door Opening Vane Layout Using Positioning System

Fig 14.2



Advance Open Sequence (UP direction)

1. Lift approaches floor level whilst decelerating.
2. Vane DZ (LV1) is energised, and at the same time the position is within the "Advance Door Open Distance" (found in the Positioning System Parameters).
    1. *Note if the LV1 vane is shorter than the "Advance Door Open Distance" or missing, no event will be reported (to inhibit nuisance reporting due to uneven distances above/below floor level). Instead the advance door opening operation will be inhibited.*
3. The micro processor starts the sequence by energising the advance open output.
4. The advance open output signals the re-lev / ado board to bridge the circuit between LZ2 and LZ1 on the re-level / ado board.
5. The micro processor monitors the lock bridge circuit via a feedback contact from the re-level board before energising the DOR pilot relay.
6. The DOR energises and the doors advance open.

The sequence for DN is identical to UP, except the direction is reversed.

The parameter "ADVANCE DOOR OPEN DISTANCE" (0-150mm), found in POSITION SYSTEM PARAMETERS, determines the amount of advance door opening, i.e.

a. More Distance = More advance door opening
b. Less Distance = Less advance door opening

Advance Open IO and Board Interface

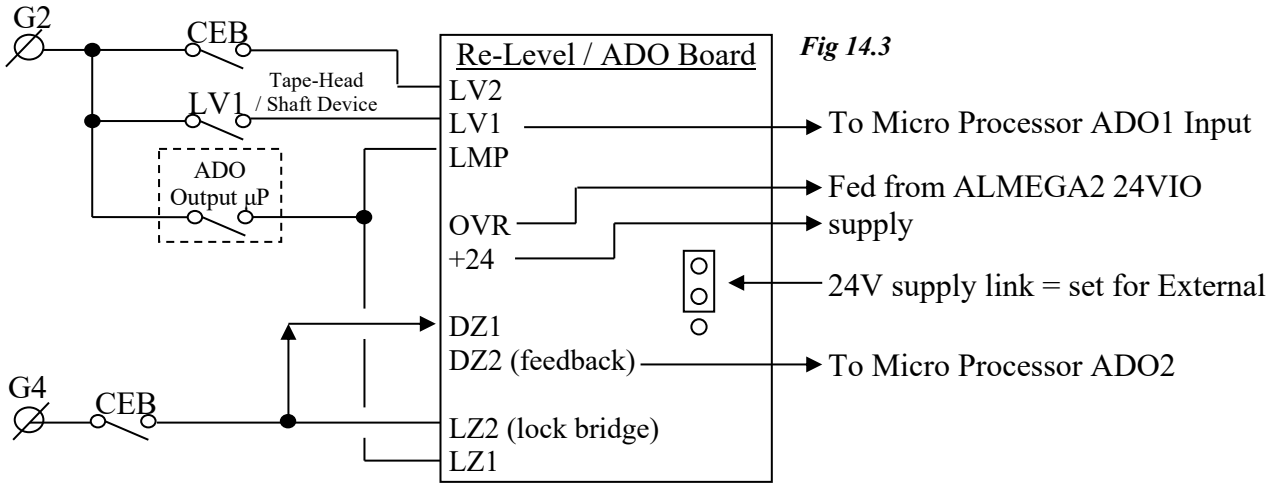


Fig 14.3

14.3) Conditions Affecting Advance Door Opening

1. If the door zone vane (DZ) to processor input LV1 has not energised when seen a stopping vane. The event "`RELEV/ADO VANE1 MISSN`" will be generated.
2. If the DZ feedback to processor input LV2 has not energised when the relev / ado board has been signalled to bridge the circuit between LZ2 and LZ1. The event "`ADO LOCK BRIDGE FAIL`" will be generated.
3. Any stuck vanes / signals will inhibit advance opening. Events in the logger such as below may be generated:
   a. `"RELEV/ADO VANE1 STUCK"`
   b. `"RELEV/ADO VANE2 STUCK"`
   c. `"  STU AND STD STUCK  "`
   d. `"      STU STUCK      "`
   e. `"      STD STUCK      "`
4. The wrong stopping vane sequence will inhibit advance opening. Events in the logger such as below may be generated:
   a. `" STOP VANE FAULT UP  "`
   b. `" STOP VANE FAULT DN  "`
5. Other conditions which will inhibit advance door opening are:
   a. When not set for advance door open (DOOR PAR, advance door open = NO)
   b. When not normal service i.e. Fire / Fire Alarm Recall.
   c. When constant pressure open i.e. Service Control.
   d. When doors are disabled.
   e. When Open on switches are disabled:
      i. Open on Init
      ii. Open on Reset
      iii. Open on Homing etc.
   f. When on High Speed.
   g. When not arrived at destination.

15) Despatcherless Group Control

The ALMEGA 2 processor has the capability and performance to provide a fast and efficient lift despatching service from Duplex up to many cars in a lift Group. This service is provided without an external despatcher.

The despatching service is based upon an “Estimated Time of Arrival” (ETA) algorithm, which calculates an estimated arrival time for each landing call. The calculations are based mainly upon lift speed, acceleration/deceleration times, door opening/closing times etc., and even down to the fine details such as car preference time and door dwell time.

The ETA’s are modelled within the microprocessor to allow the user to select the type of response required. Also parameters may be set to give an accurate representation of lift door timings; furthermore parameters may be set to measure accurately against times set, for Optimum performance. All these parameters can be found in the **ETA Setup**.

The Despatcherless system operates whereby one lift becomes the Master of the group. The decision of who is master is based upon the lowest lift number of the lifts that are connected. If two lifts have the same lift number an error will be recorded in the fault logger. Correct setting of the lift numbers i.e. parameter MY LIFT NUMBER in **System Details** will ensure trouble free operation. If the Master is removed from operation for any reason, then service continues since another lift will take over control, and this passing control would continue up to the last car remaining.

The Master receives information from each lift and calculates an estimated time of arrival for each lift to every call. The Master then allocates calls to each lift based upon the ETA’s. The calls are despatched and updated many times a second. Homing calls are also controlled by the Master, and lifts are despatched to the homing floors based upon the nearest, as and when required.

15.1) Group Algorithms

UP CALLS UP PEAK

When the number of up landing calls within the lift system is greater than the UP PEAK threshold (typically half the number of floors). The ALMEGA 2 detects an UP CALLS UP PEAK condition and reacts by strategically parking lifts within the Group, to give a faster response to the likelihood of further up calls. It achieves this by detecting the lowest up call and parking the available lifts from this floor upwards in anticipation.

DN CALLS DN PEAK

When the number of down landing calls within the lift system is greater than the DN PEAK threshold (typically half the number of floors). The ALMEGA 2 detects a DN CALLS DN PEAK condition and reacts by strategically parking lifts within the Group, to give a faster response to the likelihood of further down calls. It achieves this by detecting the highest down call and parking the available lifts from this floor downwards in anticipation.

BALANCED HEAVY TRAFFIC

When the number of down landing calls within the lift system is greater than the DN PEAK threshold, and the number of up landing calls within the lift system is greater than the UP PEAK threshold. The ALMEGA 2 detects a BALANCED HEAVY TRAFFIC condition, and reacts by strategically parking lifts within the Group, to give a faster response to the likelihood of further up and down calls. It achieves this by detecting the lowest up call and highest down call, and parks the available lifts from these floors upwards and downwards respectively in anticipation.

MAIN FLOOR UP PEAK

When the main flow of traffic is from the main floor up to various destinations, i.e. during the population of a building, the ALMEGA 2 detects a MAIN FLOOR UP PEAK condition. It reacts by strategically parking lifts within the Group to the main floor so that persons wishing to travel from the main floor have a significantly reduced waiting time. It achieves this by load sensing whilst the lifts are travelling from the main floor, and when a threshold is reached all available lifts park at the main floor.

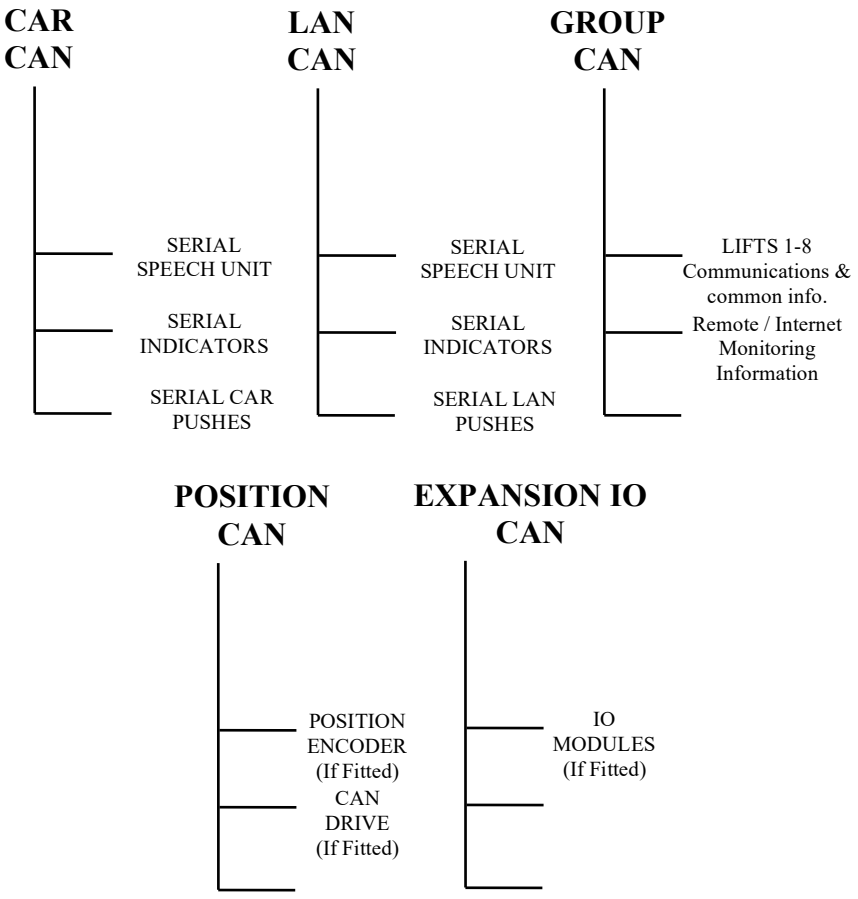
16) Serial Communication Types

The ALMEGA 2 has been designed with many types of on board communications. These different types of communications allow a wide range of uses for interfacing to the processor. Typical uses, are detailed below:

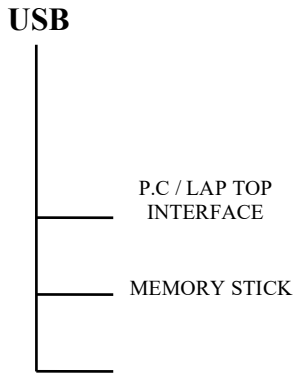
CAN Communications (Controller Area Network)

The CAN communication ports provide an interface to a range of serial products including Lester Controls Serial Speech Unit and Indicators. Also communications between lifts, specific drives, and Position Encoder are carried out over the CAN bus. Below details the uses of the CAN buses for devices that may be fitted:

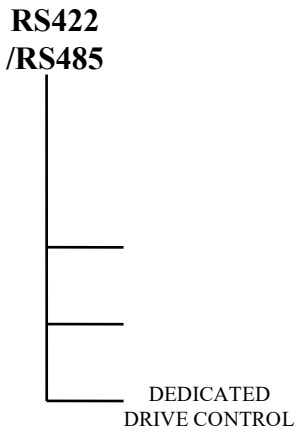
Fig 16.1



USB Communications



RS422 / RS485 Communications



17) CAN Physical Layer Connections

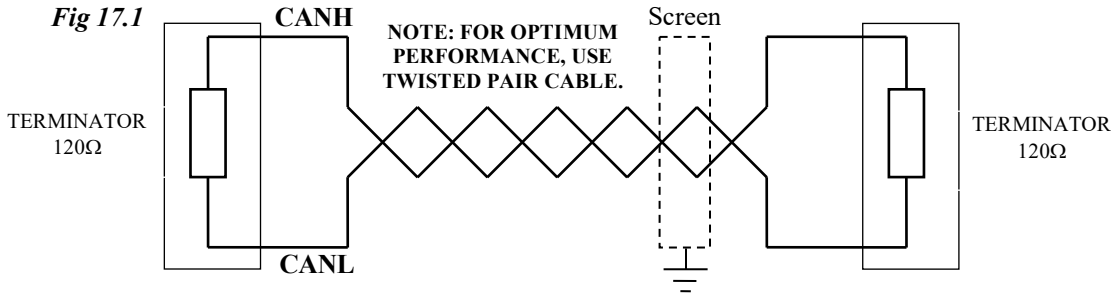
Bus Connections

The CAN field bus consists of two wires named CAN HIGH (**CANH**) and CAN LOW (**CANL**). These two wires carry all the serial information, and must be wired correctly for proper operation of the CAN field bus. In the event of a wiring error however, they can withstand short circuits to either +24V supply or 0V supply.

Importance of Bus Terminators

It is vital for correct operation that the **bus terminators** (settable via links) are connected to either end of the CAN field bus as shown below. These terminators are simply resistors of value 120Ω which are used to match the impedance of the cable.

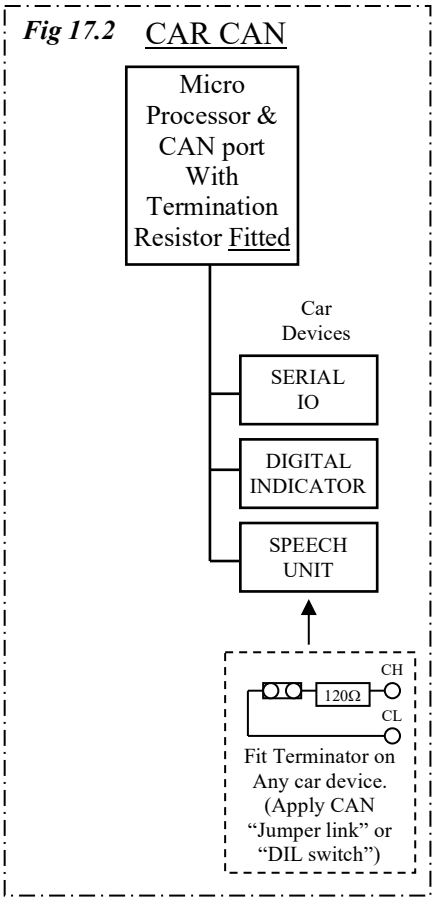
Fig 17.1



17.1) CAR CAN Connections

In order to terminate the CAN field-bus wiring properly, the terminating resistor must be applied at the correct point in the lift car as shown.

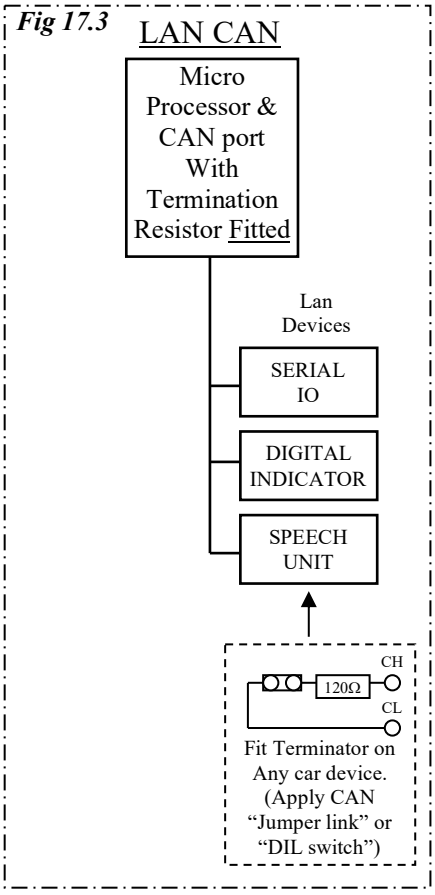
Fig 17.2



17.2) LAN CAN Connections

In order to terminate the CAN field-bus wiring properly, the terminating resistor must be applied at the correct point in the lift shaft as shown.

Fig 17.3

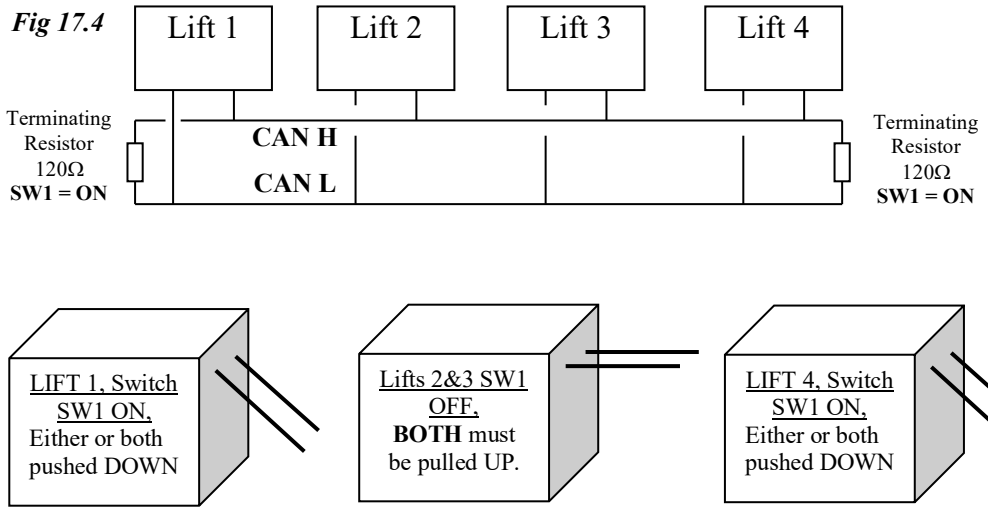


17.3) GROUP CAN Connections

Bus incorporating 4 Car Group

Below shows an example of a 4 car group, whereby field bus terminating resistors are fitted at Lift 1 and Lift 4, i.e. SW1 must be closed on the Base Unit Bottom Boards for Lift 1 and 4, but open on Lifts 2 and 3:

Fig 17.4



17.4) POSITION CAN Connections

In order to terminate the CAN field-bus wiring properly, the terminating resistor must be applied at the correct point on the position encoder as shown.

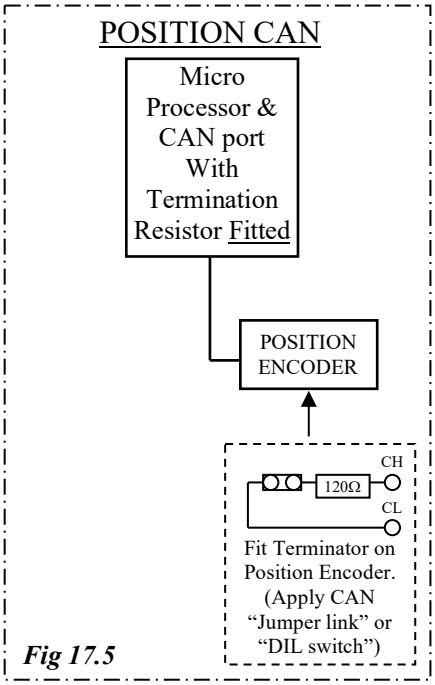


Fig 17.5

17.5) EXPANSION IO CAN Connections

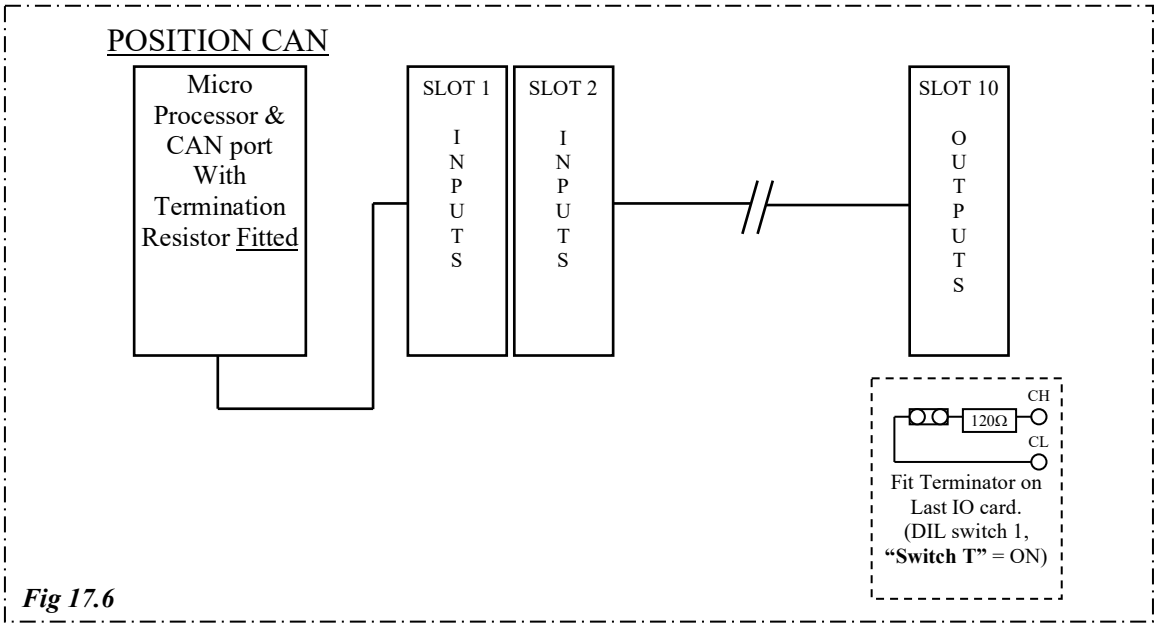


Fig 17.6

17.6) CAN field bus Fault Finding

The CAN field bus driver components that reside on each of the communication boards are very robust, as they can withstand short circuits to each other (CH to CL), and short circuits to either supply rail i.e. 0V & 24V. However they are not indestructible, and the fault finding procedure below, is intended for the rare case that one or more driver components may have got damaged, on one or more of the serial products.

Firstly, if there is a fault, the chance of anything working correctly on the bus is rare, and the majority of the time communication will cease. Within the Event History menu, an event such as below will indicate a CAN problem:

CAR CAN BUS OFF ERROR
(CAR CAN communications connection or short circuit error)

Within the ALMEGA 2 menu, the "CAN DIAGNOSTICS" screen provides information relating to the health of each CAN bus, **see menu & programming section**. This is particularly useful for fault finding!

Also LED indication on the CPU board can help, i.e. CAN LED's TX and RX should flash on frequently and mostly together. Either one of these flashing on its own, or staying ON will indicate a problem.

Identifying a fault on a TC3 Indicator / Speech unit can be relatively simple, as the LED indication on each of the boards will flash in a specific way to indicate a CAN bus fault. The "COMMS" LED, which is "RED" in colour will flash faster than normal (every 40milliseconds) to indicate a CAN bus fault. The LED should flash "ON" at a rate of once per second (if data is not changing i.e. position / doors etc.) if **normal** and once every 40milliseconds if there is a **fault**.

The following will establish whether or not a device is faulty:

1) Remove the power from that device.
2) Remove the CAN connections from that device (i.e. CH & CL).
3) Re-connect the power.
4) If the LED "C" is not flashing, that device is OK!
5) If the LED "C" is flashing "ON" once every 40milliseconds, that device is FAULTY!

This procedure should be repeated for all devices on the bus, until all faulty devices have been identified. Faulty devices cannot be repaired easily on site and should be returned to Lester Control Systems for repair.

18) RS422 / RS485 Connections

Similar to the CAN field bus, RS422 and RS485, also require **bus terminators** connected to either end of the field bus. These terminators are simply resistors of value 120Ω which are used to match the impedance of the cable.

The following shows connections for RS422/485 respectively (with BUS terminations):

Fig 18.1

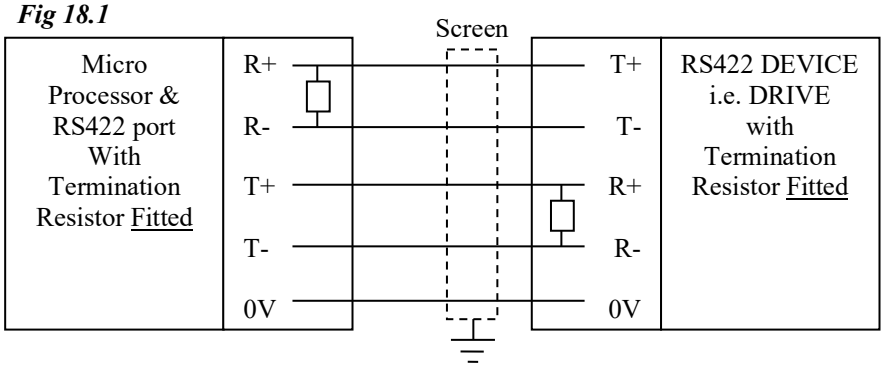
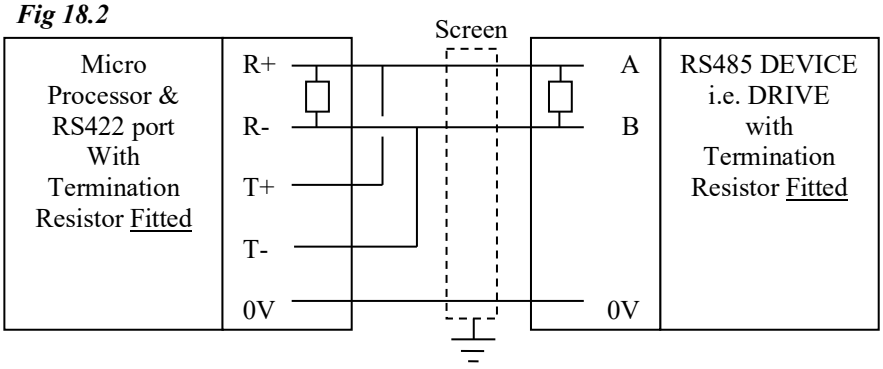


Fig 18.2



19) Serial Indicator and Speech Unit Controls Overview

The ALMEGA 2 has many features and controls applicable to the TC3 Indicator and Speech unit. These controls, settable via parameters, provide a user-friendly interface, and increase flexibility, making factory and site setup/modifications relatively simple. The ALMEGA 2 is able to interface directly to the TC3 products, without an interface unit.

Using a P.C, or laptop, is the most user friendly way for programming / setup, however this also can be achieved using the ALMEGA 2 menu system.

The Serial Indicator can be programmed for:

i) Floor Position Text 2 to 16 characters.

ii) Message Text 2 to 35 characters.

a. Messages are usually automatically selected according to specific conditions (i.e. INSPECTION CONTROL when on inspection and FIRE CONTROL when on FIRE etc).
b. There are also 6 user programmable messages which may be triggered from an external input or from an internal processor condition.
c. Messages are also prioritised to a specific order, but the priorities may be changed to suit.

iii) There are a selection of enable controls for:

a. Character Colours.
b. Direction Arrow controls.
c. Hall Lantern Controls.
d. Gong Output Enable & Hush Times.
e. 2 Digit Controls.
f. Scroll Speed

The Serial Speech Unit can be programmed for:

i) Position Phrases 1 to 5 phrases.

ii) Door Phrases 1 to 5 phrases.

iii) Direction Phrases 1 to 5 phrases.

iv) Message Phrases 1 to 5 phrases.

a. Messages are usually automatically selected according to specific conditions (i.e. INSPECTION CONTROL when on inspection and FIRE CONTROL when on FIRE etc).
b. There are also 6 user programmable messages which may be triggered from an external input or from an internal processor condition.
c. Messages are also prioritised to a specific order, but the priorities may be changed to suit.

v) There are a selection of enable controls for:

a. Mind the Doors annunciation.
b. Speech between Floors.
c. Speech trigger when stopped.
d. Direction repeated when closing.
e. Gong Output Enable & Hush Times.

See menu & programming section for more information.

20) List of Configurable Inputs

Below is a Typical list of configurable Inputs.

1. EMER
2. CARL
3. LANL
4. TEST_UP
5. TEST_DN
6. HYD_OTL
7. DRIVE_LEV_SPEED
8. RELEV_1
9. RELEV_2
10. ADO_1

11. ADO_2
12. RLEV_LKBR
13. IP13
14. PRE_LOCK
15. IP15
16. IP16
17. SLU_HS
18. SLD_HS
19. SLU_MS3
20. SLD_MS3

21. SLU_MS2
22. SLD_MS2
23. SLU_MS1
24. SLD_MS1
25. IP25
26. IP26
27. IP27
28. IP28
29. IP29
30. STU

31. STD
32. STR
33. RSU
34. RSD
35. UMD_BRAKE1
36. UMD_BRAKE2
37. UMD_FAULT
38. UMD_SOL_MON
39. UMD_CANCEL_SOL_DLY_FB
40. UMD_BUCHER_iVALVE

41. AUX_BRAKE_MON
42. IP42
43. IP43
44. DOL
45. DCL
46. DOC
47. DOP
48. SE
49. DLR
50. DCP

51. DOOR_HOLD
52. FRONT_DZ
53. REAR_DOL
54. REAR_DCL
55. REAR_DOC
56. REAR_DOP
57. REAR_SE
58. REAR_DLR
59. REAR_DCP
60. REAR_DOOR_HOLD

61. REAR_DZ
62. SIDE1_DOL
63. SIDE1_DCL
64. SIDE1_DOC
65. SIDE1_DOP
66. SIDE1_SE
67. SIDE1_DLR
68. SIDE1_DCP
69. SIDE1_DOOR_HOLD
70. SIDE1_DZ

71. SIDE2_DOL
72. SIDE2_DCL
73. SIDE2_DOC
74. SIDE2_DOP
75. SIDE2_SE
76. SIDE2_DLR
77. SIDE2_DCP
78. SIDE2_DOOR_HOLD
79. SIDE2_DZ
80. PLLEL_DOORS

81. DISABLE_DOORS
82. IP82
83. IP83
84. IP84
85. IP85
86. IP86
87. THERM
88. TEST_SWITCH
89. FIRE
90. FIRE2

91. FAR1
92. FAR2
93. SERV
94. PRI_SRV_1
95. PRI_SRV_2
96. PRI_SRV_3
97. SHUTDOWN
98. LW110
99. LW90
100. HANDWIND

101. BRAKE_TEST
102. ALARM
103. ALARM_LATCH
104. ALARM_LATCH_RESET
105. CODE_BLUE_HOLD
106. FFIGHT_CAR_SW
107. AUTO_SRV
108. EMER_SUPPLY
109. NORM_SUPP
110. EVAC

111. JOURNEY_COUNTER_ENABL
112. CODE_BLUE_CAR_SWITCH
113. IP113
114. IP114
115. IP115
116. IP116
117. IP117
118. IP118
119. IP119
120. IP120

121. IP121
122. SPEECH_MSG1
123. SPEECH_MSG2
124. SPEECH_MSG3
125. SPEECH_MSG4
126. SPEECH_MSG5
127. SPEECH_MSG6
128. SPEECH_HUSH
129. IP129

130. IP130

131. IND_MSG1
132. IND_MSG2
133. IND_MSG3
134. IND_MSG4
135. IND_MSG5
136. IND_MSG6
137. IND_HUSH
138. IP138
139. IP139
140. TIME1_CALL_TABLE

141. TIME2_CALL_TABLE
142. TIME3_CALL_TABLE
143. TIME4_CALL_TABLE
144. TIME5_CALL_TABLE
145. IP145
146. IP146
147. IP147
148. IP148
149. IP149
150. FFIGHT_RESET_POSN_A

151. FFIGHT_RESET_POSN_B
152. FFIGHT_RESET_POSN_C
153. FFIGHT_RESET_POSN_D
154. FFIGHT_RESET_POSN_E
155. FFIGHT_RESET_POSN_F
156. A_HEALTHY
157. B_HEALTHY
158. C_HEALTHY
159. D_HEALTHY
160. E_HEALTHY

161. F_HEALTHY
162. G_HEALTHY
163. H_HEALTHY
164. PSLU_01
165. PSLU_02
166. PSLU_03
167. PSLU_04
168. PSLU_05
169. PSLU_06
170. PSLU_07

171. PSLU_08
172. PSLU_09
173. PSLU_10
174. PSLD_01
175. PSLD_02
176. PSLD_03
177. PSLD_04
178. PSLD_05
179. PSLD_06
180. PSLD_07

181. PSLD_08
182. PSLD_09
183. PSLD_10
184. PAWL_STU
185. PAWL_STD
186. PAWL_SOL1
187. PAWL_SOL2
188. PAWL_SOL3
189. PAWL_SOL4
190. PAWL_SOL5

191. PAWL_SOL6
192. PAWL_SOL7
193. PAWL_SOL8
194. PAWL_PLATF1
195. PAWL_PLATF2
196. PAWL_PLATF3

197. PAWL_PLATF4
198. PAWL_PLATF5
199. PAWL_PLATF6

200. PAWL_PLATF7
201. PAWL_PLATF8
202. IP202
203. IP203
204. IP204
205. IP205
206. IP206
207. MON_POINT_01
208. MON_POINT_02
209. MON_POINT_03
210. MON_POINT_04

211. MON_POINT_05
212. MON_POINT_06
213. MON_POINT_07
214. MON_POINT_08
215. MON_POINT_09
216. MON_POINT_10
217. CAR_GATE_MON1
218. CAR_GATE_MON2
219. IP219
220. M_UP_PK_PRI_FLR1

221. M_UP_PK_PRI_FLR2
222. M_UP_PK_PRI_FLR3

Normal / Front Door Calls

Landing Up Calls	
300 - 330	LU1 to LU31
Landing Dn Calls	
331 - 361	LD2 to LD32
Car Calls	
362 - 393	CP1 to CP32
Code Blue Calls	
394 - 425	CB1 to CB32
Special Up Calls	
426 - 456	SPLU1 to SPLU31
Special Dn Calls	
457 - 487	SPLD2 to SPLD32

Rear Door Calls

Landing Up Calls Rear	
488 - 518	LU1R to LU31R
Landing Dn Calls Rear	
519 - 549	LD2R to LD32R
Car Calls Rear	
550 - 581	CP1R to CP32R
Code Blue Calls Rear	
582 - 613	CB1R to CB32R
Special Up Calls Rear	
614 - 644	SPLU1R to SPLU31R
Special Dn Calls Rear	
645 - 675	SPLD2R to SPLD32R

Side 1 Door Calls

Landing Up Calls Side 1	
676 - 706	LU1S1 to LU3S1
Landing Dn Calls Side 1	
707 - 737	LD2S1 to LD32S1
Car Calls Side 1	
738 - 769	CP1S1 to CP32S1
Code Blue Calls Side 1	
770 - 801	CB1S1 to CB32S1
Special Up Calls Side 1	
802 - 832	SPLU1S1 to SPLU31S1
Special Dn Calls Side 1	
833 - 863	SPLD2S1 to SPLD32S1

Side 2 Door Calls

Landing Up Calls Side 2	
864 - 894	LU1S2 to LU3S2
Landing Dn Calls Side 2	
895 - 925	LD2S2 to LD32S2
Car Calls Side 2	
926 - 957	CP1S2 to CP32S2
Code Blue Calls Side 2	
958 - 989	CB1S2 to CB32S2
Special Up Calls Side 2	
990 - 1020	SPLU1S2 to SPLU31S2
Special Dn Calls Side 2	
1021 - 1051	SPLD2S2 to SPLD32S2

Engineers Access

1052- 1082	EN ACS 2 to EN ACS 32

21) List of Configurable Outputs

Below is a Typical list of configurable Outputs.

1. UPR
2. DNR
3. HSR
4. LSR
5. RELEV
6. RETIRING_RAMP
7. STAR
8. DELTA
9. BR_LIFT_REL
10. DRV_ENABLE

11. DRV_BIN_SPA
12. DRV_BIN_SPB
13. DRV_BIN_SPC
14. DRV_TOP_SP
15. QUICK_SLOW
16. STP_2NDVANE
17. LEARN_RUN
18. UMD_CANCEL_SOL_DLY
19. UMD_FAILURE
20. CAR_GATE_MON_FAILURE

21. SLOW_LIMIT_HS
22. OP22
23. OP23
24. OP24
25. IU
26. ID
27. OP27
28. OP28
29. OP29
30. ADV_OPEN

31. FRONT_DOOR_OP
32. REAR_DOOR_OP
33. SIDE1_DOOR_OP
34. SIDE2_DOOR_OP
35. SE_HELD
36. DOP_HELD
37. DLR_HELD
38. DOP_SE_DE_HELD
39. DOP_ILLUMINATION

40. OP40
41. OP41
42. OP42
43. OP43
44. OP44
45. DOR
46. DCR
47. NUG
48. HLR
49. HLR_U
50. HLR_D

51. GONG
52. OP52
53. OP53
54. REAR_DOR
55. REAR_DCR
56. REAR_NUG
57. REAR_HLR
58. REAR_HLR_U
59. REAR_HLR_D
60. REAR_GONG

61. REAR_DOP_ILLUMINATION
62. REAR_FIRE_FAR_IN_CAR_WARN
63. SIDE1_DOR
64. SIDE1_DCR
65. SIDE1_NUG
66. SIDE1_HLR
67. SIDE1_HLR_U
68. SIDE1_HLR_D
69. SIDE1_GONG
70. SIDE1_DOP_ILLUMINATION

71. SIDE1_FIRE_FAR_IN_CAR_WARN
72. SIDE2_DOR
73. SIDE2_DCR
74. SIDE2_NUG
75. SIDE2_HLR
76. SIDE2_HLR_U
77. SIDE2_HLR_D
78. SIDE2_GONG
79. SIDE2_DOP_ILLUMINATION

80. SIDE2_FIRE_FAR_IN_CAR_WARN
81. OSI
82. OLI
83. LW90_IND
84. OP84
85. OP85
86. FIRE_IND
87. FIRE_OR_FAR
88. FFIGHT_RESET
89. TEST_IND
90. SHUTDN

91. PREPARE_TO_TEST
92. THERMISTOR_TRIPPED
93. ESUP_O
94. ESUP_RETURNED
95. ESUP_RETURNED_DO
96. ESUP_SELECTED
97. PRI_SRV_1_IND
98. PRI_SRV_2_IND
99. PRI_SRV_3_IND
100. NORMAL_SERV

101. LIFT_IN_SERV
102. CODE_BLUE_IND
103. FIRE_WARNING
104. AUTO_SRV_IND
105. SERV_IND
106. EVAC_IND
107. FAR_1_IND
108. FAR_2_IND
109. FAR_IND
110. ENG_ACCESS

111. ENG_ACCESS_DIVE_COMPLETE
112. FIRE_FAR_CAR_TOP_WARN
113. FIRE_FAR_IN_CAR_WARN
114. BIN_POS_A
115. BIN_POS_B
116. BIN_POS_C
117. BIN_POS_D
118. BIN_POS_E
119. BIN_POS_F
120. TIME1_CALL_TABLE_OUTPUT

121. TIME2_CALL_TABLE_OUTPUT
122. TIME3_CALL_TABLE_OUTPUT
123. TIME4_CALL_TABLE_OUTPUT
124. TIME5_CALL_TABLE_OUTPUT
125. FIRE_FAR_RAW
126. OP126
127. OP127

128. OP128
129. OP129
130. STU_OP

131. STD_OP
132. WITHIN_FLEV
133. SPEECH_TRIGGER
134. JOURNEY_COUNT_EXCEEDED
135. ALLOC_REVS_EXCEEDED
136. ALARM_FILTER
137. CAR_LIGHT
138. POS_IND_ESAVE_OP
139. ALARM_LATCH_OP
140. POSITION_OP_ENABLE

141. POSN_DEV_PWR_OP
142. CALLS_IN_SYSTEM
143. OP143
144. OP144
145. OP145
146. OP146
147. GATE_OP_WARN
148. LOCK_ALARM
149. LOCK_TIP_HI
150. LOCK_TIP_LO

151. START_FAIL
152. STUCK_BFLRS
153. DOOR_OP_PROT
154. DOOR_CL_PROT
155. GATE_LCK_FLT
156. MOTION_FAIL
157. EMER_STOP
158. UNABLE_TO_OPEN_DOOR
159. ERROR_IN_POSITION
160. DOUBLE_JOURNEY

161. HYDRAULIC_OVERTRAVEL
162. RELEVELLING_ERROR
163. LOST_24V
164. PRE_FLITE_CHECK_FAIL
165. IO_BOARDS_CHANGED
166. STUCK_CAR_BUTTON
167. STUCK_LAN_BUTTON
168. IO_CONFIG_ERROR
169. CARCAL_PRESSED
170. LANCAL_PRESSED

171. LIFT_IN_USE
172. AUTO_CAR_PREF
173. LIFT_FAIURE
174. LIFT_HEALTHY
175. CAN0_BUS_OFF
176. CAN1_BUS_OFF
177. CAN2_BUS_OFF
178. CAN3_BUS_OFF
179. CAN4_BUS_OFF
180. CODE_BLUE_HELD_OP

181. SIO_CAR_COMMS_LOST
182. SIO_LAN_COMMS_LOST
183. POSN_DEV_FAULT
184. DRIVE_FAULT
185. PAWL_UP
186. PAWL_DN
187. PAWL_DIR_CTRL
188. PAWL_SOL
189. PAWL_SPD
190. PAWL_FLT
191. PAWL_RECOVERY_RUN
192. PAWL_PLTFS_ENGAGED_OP
193. OP193
194. OP194
195. PRI_SRV1_RETURNED
196. PRI_SRV2_RETURNED
197. PRI_SRV3_RETURNED
198. BRAKE_CONTROLLER_FAULT
199. PROG_SPEED_OP1

Front HLR

Hall Lantern Up

300 - 330	HLU1 to HLU31

Hall Lantern Dn

331 - 361	HLD2 to HLD32

Position

Position

362 - 393	PI1 to PI32

Rear HLR

Hall Lantern Up

430 - 460	RHLU1 to RHLU31

Hall Lantern Dn

461 - 491	RHLD2 to RHLD32

Side 1 HLR

Hall Lantern Up

492 - 522	S1HLU1 to RHLU31

Hall Lantern Dn

523 - 553	S1HLD2 to S1HLD32

Side 2 HLR

Hall Lantern Up

554 - 584	S2HLU1 to S2HLU31

Hall Lantern Dn

585 - 615	S2HLD2 to S2HLD32

22) Uncontrolled Movement(UMD) Fault Codes and Fault Reset

To Reset a UMD Fault:

1. Press MAIN MENU, then Press ENGINEER'S SELECTION.
2. Move Down to UMD MONITORING FAIL, Press SELECT.
3. Press the NO button (square) and press OK.

The EVENT "UMD MONITORING ERCODE" will be generated in the event logger when a UMD fault occurs. This event has a Sub Event Code associated with it which is the cause of the UMD fault. The sub event code can be viewed by locating the event in the Event History and pressing it to see the detailed information. The codes are as below.

Brake Monitoring / Algi Dual Valve Monitoring:

UMD_BRAKE_MON_INPUTS_NOT_CONFIGURED	= 1
UMD_BRAKE_MON_INPUT_1_START_FAILURE	= 2
UMD_BRAKE_MON_INPUT_2_START_FAILURE	= 3
UMD_BRAKE_MON_INPUTS_BOTH_START_FAILURE	= 4
UMD_BRAKE_MON_INPUT_1_STUCK	= 5
UMD_BRAKE_MON_INPUT_2_STUCK	= 6
UMD_BRAKE_MON_INPUT_1_MOTION_WARNING	= 19
UMD_BRAKE_MON_INPUT_2_MOTION_WARNING	= 20
UMD_BRAKE_MON_INPUTS_BOTH_MOTION_WARNING	= 21
UMD_BRAKE_MON_INPUT_1_MOTION_FAILURE	= 23
UMD_BRAKE_MON_INPUT_2_MOTION_FAILURE	= 24
UMD_BRAKE_MON_INPUTS_BOTH_MOTION_FAILURE	= 25

Overspeed Governor Solenoid Monitoring:

UMD_SOL_MON_IP_NOT_CONFIGURED	= 7
UMD_CANCEL_SOL_DLY_FBACK_IP_NOT_CONFIG	= 8
UMD_SOL_MON_INPUT_START_FAILURE	= 9
UMD_SOL_MON_INPUT_STUCK	= 10
UMD_SOL_CANCEL_DLY_OP_ENERGISE_FAIL	= 11
UMD_SOL_CANCEL_DLY_OP_RELEASE_FAIL	= 12
UMD_SOL_MON_INPUT_MOTION_WARNING	= 22
UMD_SOL_MON_INPUT_MOTION_FAILURE	= 26

External Device Fault Input:

UMD_FAULT_INPUT_NOT_CONFIGURED	= 13
UMD_FAULT_INPUT_ERROR	= 14

Bucher i-valve:

UMD_BUCHER_iVALVE_INPUT_NOT_CONFIGURED	= 15
UMD_BUCHER_iVALVE_INPUT_START_FAILURE	= 16
UMD_BUCHER_iVALVE_INPUT_NOT_ASSERTED_AT_STOP	= 17

Misc:

UMD_DETECTED_OUT_OF_DZ_NO_LOCKS	= 18

Parameter Corruption Check:

UMD_START_FAIL_COUNT_PARAM_CORRUPT	= 91
UMD_STOP_FAIL_TIME_PARAM_CORRUPT	= 92

23) Drive Fault Codes (for Drives with serial Communications)

The Event “DRIVE FAULT” will be generated in the event logger when a Drive fault occurs. This event has a Sub Event Code associated with it which is the cause of the drive fault. The fault is transferred from the drive through the serial communications interface to the Almega 2. The sub event code can be viewed by locating the event in the Event History and pressing on it to see the detailed information. The codes are as below.

23.1) Magnetek HPV600 900 Drive Fault Codes

Fault #	Fault # (hex)	Name	Description
1	0x01	OVERVOLT FLT	The DC bus voltage of the drive exceeded: 850 Volts for a 460V class drive 425 Volts for a 230V class drive.
2	0x02	UNDERVOLT FLT	Generated during a run condition when the DC bus voltage drops below the user specified percent of the input line-to-line voltage. The input line-to-line voltage is specified by the Input L-L Volts parameter and the fault level is specified by the Undervoltage Fault Level parameter.
3	0x03	OVERCURR FLT	The phase current exceeded 300% of rated current.
4	0x04	FUSE FAULT	The DC bus fuse on the drive is open.
5	0x05	REVERSE TACH	
6	0x06	PHASE LOSS	The drive senses an open motor phase. The drive senses more than one motor phase crossing zero at the same time.
7	0x07	CURR REG FLT	Actual current does not match the command current. The drive is commanding more motor voltage then is available on the input.
8	0x08	OVERSPEED FLT	Generated when the motor has gone beyond the user defined percentage contract speed for a specified amount of time.
9	0x09	CHARGE FAULT	The DC bus voltage has not stabilized above the voltage fault level within 2 seconds or the charge contactor has not closed after charging. Or The DC bus voltage is below the UV Fault level as defined by the INPUT L-L VOLTS (A4) and UV FAULT LEVEL (A4) parameters
10	0x0A	DRIVE OVRLOAD	The drive has exceeded the drive overload curve.
11	0x0B	OVERTEMP FLT	The heatsink on the drive has exceeded 95°C (203°F).
12	0x0C	ENCODER FAULT	The drive is in a run condition and the encoder is: not functioning or not connected. or phasing is not proper with the motor.
13	0x0D	GROUND FAULT	The sum of all phase currents has exceeded 50% of the rated amps of the drive.
14	0x0E	CONTACTOR FLT	The command to close the contactor and the contactor feedback do not match before the time specified by the Contact Flt Time parameter.
15	0x0F	BRK PICK FLT	The brake pick command and the brake feedback did not match for the time specified with Brake Pick Time parameter.
16	0x10	BRK HOLD FLT	The brake hold command and the brake feedback did not match for the time specified with Brake Hold Time parameter.
17	0x11	EXTRN FAULT 1	User defined external logic fault input
18	0x12	EXTRN FAULT 2	User defined external logic fault input
19	0x13	EXTRN FAULT 3	User defined external logic fault input
20	0x14	BRAKE FAULT	Dynamic brake resistor overcurrent.
21	0x15	CUBE ID FAULT	The identification number for the drive is invalid.
22	0x16	MOTOR ID FLT	Motor ID fault
24	0x18	SETUP FAULT 1	This fault is declared if the rated motor speed and excitation frequency do not satisfy: …checks for too low or too high value of slip
25	0x19	SETUP FAULT 2	This fault is declared if the number of poles and encoder pulses per revolution do not satisfy:
26	0x1A	SETUP FAULT 3	This fault is declared if the number of poles is not an even number.
27	0x1B	SETUP FAULT 4	This fault is declared if the contract motor speed (in rpm) and encoder pulses/revolution do not satisfy:
28	0x1C	SETUP FAULT 5	This fault is declared if the rated motor power (in watts) and rated motor voltage do not satisfy:
29	0x1D	DCU DATA FLT	DCU data fault

Fault #	Fault # (hex)	Name	Description
30	0x1E	PCU DATA FLT	
31	0x1F	CUBE DATA FLT	Cube data fault
32	0x20	MTR DATA FLT	This fault is declared if any motor nameplate data information in the A5 submenu is 0.
33	0x21	SRL TIMEOUT	The drive is being operated by serial communications and one of the following has occurred: • Communication time-out – if the serial run bit is set and the drive does not receive a run-time message for 40 msec • Bad message checksum – drive has detected fifteen consecutive bad message checksums
34	0x22	SETUP FAULT 6	This fault is declared if the multi-step speed references have exceeded a defined limit, which is defined in terms of a percentage of contract speed (CONTRACT CAR SPD parameter).
35	0x23	SETUP FAULT 7	This fault is declared if the run logic inputs are defined incorrectly. You can either choose group #1 (RUN and UP/DWN) or group #2 (RUN UP and RUN DOWN). But you cannot mix and match or this fault will be declared.
36	0x24	TQLim2Hi4Cube	The torque limits (based on the defined motor) exceed the cube's capacity
37	0x25	SETUP FAULT 8	This fault is declared if the DIR CONFIRM (C1) parameter is enabled and any of the following conditions are not met: A logic input (C2) must be assigned to RUN UP. A logic input (C2) must be assigned to RUN DOWN. The SPD COMMAND SRC (C1) parameter must be set to ANALOG INPUT ... Confirms proper set-up of Analog Speed Command direction confirm function
38	0x26	V/HZ FAULT	This fault is following two formulas are not satisfied:
40	0x28	EXTRN FAULT 4	User defined external logic fault input
43	0x2B	RTR NOT ALIGN	Run command given before a valid rotor alignment number was calculated (Clears automatically)
44	0x2C	ENCDR CRC ERR	Absolute encoder checksum error is detected. The alarm is posted if the CRC error does not affect drive operation. If the error persists, the alarm is converted into the fault.
46	0x2E	MOTOR PHASE FLT	Speed feedback is backwards during an Open-Loop Alignment
47	0x2F	Z MARKER LOST	This fault is declared when the drive expects to see a signal from the Z channel of the encoder within a window but it doesn't during an Open-Loop Alignment.
48	0x30	STALL FAULT	Generated when the motor current goes at or above a percentage (defined by STALL TEST LVL) for defined amount of time (defined by STALL FAULT TIME).
51	0x33	ENDAT MISMATCH	Endat mismatch
52	0x34	DB VOLTAGE	Dynamic braking IGBT is still on ten seconds after the drive stops running
53	0x35	MSPD TIMER FAULT	Multi-Step Speed Delay timer fault
54	0x36	SHORT CIRCUIT	The integrated power module is sensing an overcurrent or over temperature condition
55	0x37	SER2 SPD FLT	This fault is declared if the SER2 INSP SPD (A1) or SER2 RS CRP SPD (A1) parameters have exceeded contract speed (CONTRACT CAR SPD (A1) parameter).
56	0x38	MOTOR OVRLOAD	The motor had exceeded the user defined motor overload curve. Note: fault or alarm setting dependant on setting of MOTOR OVRLD SEL (C1) parameter.
57	0x39	SPD DEV FLT	The speed feedback is failing to properly track the speed reference
58	0x3A	SETUP FAULT 9	This fault is declared if the same value is listed as multiple logic inputs
59	0x3B	SETUP FAULT 10	This fault is declared if the Input L-L Volts is set to 000.00
60	0x3C	BRK OPEN FLT	The drive saw movement during either the Rotor Align (U10) or the Auto-Tune (U12)

Fault #	Fault # (hex)	Name	Description
61	0x3D	AT CONT FLT	Drive sees an open phase during Autotune or Auto Align
63	0x3F	SAFE-OFF OPEN	The drive has received a run command, but the “Safe-Off” input is open. • If the “Safe-Off” input is open and the drive is in the ready state, but has a run command active, then “Safe-Off Open” will be declared after 1 second (But the IGBTs will be disabled immediately) • If the “Safe-Off” input becomes open whilst the drive is in a run condition, “Safe-Off Open” will be declared after 50ms (But the IGBTs will be disabled immediately).
64	0x40	SETUP FAULT 11	This fault is declared if ENCODER SELECT (C1) = ENDAT ABSOLUTE and the number of pulses entered in ENCODER PULSES (A1) is greater than 3125
65	0x41	QUICKSTART FAULT	
66	0x42	TACH LOSS	See ENCODER FLT
67	0x43	SETUP FAULT 12	This fault is declared when one or more parameter values are set outside the acceptable limit when • the U9 Drive Mode is changed from one to another • or the parameters were being loaded from EE to RAM.
68	0x44	SAFE-OFF SETUP	Safe-Off has been incorrectly set up. Fault will be declared if Logic Input 9 is configured to “Safe-Off”, and switch is set to I9 OR if the switch is set to BE and the drive is told to RUN without Logic Input 9 being triggered
69	0x45	NTSD SPEED SETUP	This fault is declared if the NTSD Threshold(s) parameters does not satisfy: Contract car speed (A1) ≥ NTSD Threshold 3 > NTSD Threshold 2 > NTSD Threshold 1
70	0x46	NTSD LI SETUP	This fault is declared if the selected NTSD Mode (C1) does not match with the correct setting of the Logic Inputs (C2) NTSD Input 1 and NTSD Input 2 • NTSD Input 1 has to be set in Logic Inputs (C2) if NTSD Mode (C1) is 1 Threshold, 2 Thresholds, or 3 Thresholds • NTSD Input 2 has to be set in Logic Inputs (C2) if NTSD Mode (C1) is 2 Thresholds or 3 Thresholds
72	0x48	Encdr PPR Fault	(Axial Flux Fault)

23.2) Zeihl Abegg Z4C Drive Fault Codes

The maskable errors are marked in the error list with a **point** in the column **M.**
Errors that lead to the locking of the ZAdyn4C are identified by a **dot** in the **S** column.

Error 1xx

- Hardware configuration error
- Software error

Error no.	Error text	Error cause	M	S
100	Serial no. missing	Frequency inverter/CU does not have a serial number, e.g. after a component replacement		•
101	System-Error	A defective internal component was identified during a self-test of the frequency inverter		•
110 120	CU: No ID	CU ID no. was not detected: CU is not present or its ID EEPROM does not reply		•
111	CUSH: No ID	Shunt ID no. was not detected: Shunt module is not present or its ID EEPROM does not reply		•
113 123	CUEE: No ID	ID No. of the extension card for the encoder is not recognized: extension module is not present or its ID EEPROM does not reply	•	
115 125	SP: No ID	Switching power supply ID no. was not detected: Switching power supply is not present or its ID EEPROM does not reply		•
116 126	PP: No ID	Power print ID no. was not detected: Power print is not present or its ID EEPROM does not reply		•
117 127	MP: No ID	The print module ID no. was not detected: Module Print is not present or its ID EEPROM does not reply		•
121	CUSH: ID-Error	Internal shunt module was detected but there are problems with the shunt module's informational content		•
140	MP:Unknown IGBT	A unknown IGBT-module was recognized		
141	MP: Temp.Sens?	The external temperature sensor for the Modul Print is not recognized	•	
150	HW-Conflict !	Shuntmodul, Power Print and Modul Prind do not match		
160	ADC adj.:outside tol.	**Error:**2The deviation between the first measured value and the second measured value during the zero point comparison of the motor current measurement is greater than 2 %.	•	
174	CUMT:Not detect	Option module for the temperature monitoring of the motor is nit recognized: Check the configuration for rhe temperature monitoring in the "Monitoring" menu		•
180	UF CTRL=DCP2/4	**Error:** DCP2 or DCP4 is configured as the actuation type. This is not possible during operation without a rotary encoder **Remedy:** Enter DCP1 or DCP3 for the communication	•	

Error 2xx

- Configuration error

Error no.	Error text	Error cause	M	S
200	Stop input	**Error:** A parameter is open while apply a correct travel command (RF + RVx + Vx) **Remedy:** End parameter inputs	•	
201	Motor name plate	**Error:** a parameter in the "Motor name plate" menu has not been assigned **Remedy:** Check the parameter in the "Motor name plate" menu,		
202	MOT_TYP = ?	**Error:** No motor type was selected in the "Motor name plate" menu **Remedy:** Enter in the "Motor name plate"menu		•
203	n* = 0?	**Error:** No speed was entered in the "Installation" menu **Remedy:** Enter the speed at V* in the "Installation" menu directly or have it calculated based on the installation data		•
204	n* > 3*n	**Error:** n* was incorrectly calculated due to incorrect installation data (n* >3xn) **Remedy:** Check the installation data for correct entry	•	
205	Input duplicated	Fault When using a feedback unit in connection with a brake resistor the **Error:** two digital inputs are assigned with the same function **Remedy:** Change the function allocation of the digital inputs		•
207	Input PFU_BR miss.	temperature monitor of the brake resistor is not programmed **Remedy:** Parameterise digital input (preferably X_BR4) in the "Control" menu to the "PFU_BR" function		

Error no.	Error text	Error cause	M	S
208	DELAY active	**Error:** Emergency stop was done by deactivating of the input with the function "/DELAY" At travel start, the input with the function "/DELAY" is not active **Remedy:** Check the triggering of the input with the function "/DELAY"		
210	Wrong ENC_TYP	**Error:** Rotary encoder type and motor type are not compatible **Remedy:**Enter the correct rotary encoder type in the "Encoder & BC" menu	•	•
211	No binary encoder	**Error:** Binary resolution not configured for rotary encoder type TTL sinus or EnDat/SSI **Remedy:** Enter a binary resolution (e.g. 512, 1024 or 2048)		
213	ZR_EN /ZR_RDY miss-ing	**Error:**"ZR_RDY" or "ZR_EN" was not configured **Remedy:**Set digital input to "ZR_RDY" or set digital output to "ZR_EN"		
220	Error: SM data	**Error:** While operating synchronous motors, the values for the rated speed (n) and the rated frequency (f) do not match in the "Motor name plate" menu **Remedy:** Enter the correct data for rated speed and rated frequency in the "Motor name plate" menu	•	•
221	Error: ASM data	**Error:** While operating asynchronous motors, the values for the rated speed (n) and the rated frequency (f) do not match in the "Motor name plate" menu **Remedy:** Enter the correct data for rated speed and rated frequency in the "Motor name plate" menu	•	•
231	V_G1 > 150% V*	**Error:** the limit value configured for V_G1 is too large **Remedy:** Configure the limit value V_G1 to max 150% V* in the "Control system" menu		
232	V_G2 > 150% V*	**Error:** the limit value configured for V_G2 is too large **Remedy:** Configure the limit value V_G2 to max 150% V* in the "Control system" menu		
233	V_G3 > 150% V*	**Error:** the limit value configured for V_G3 is too large **Remedy:** Configure the limit value V_G3 to max 150% V* in the "Control system" menu		
240	ZR:Not RDY	**Error:** At start of travel, no signal present at the digital input set to "ZR_RDY" **Remedy:** Check wiring Use the ZArec display to check for an error at the ZArec Exit ZArec configuration level		
250	Disc: No Enc Adj.	**Error:** Rotor position unknown **Remedy:** Switch frequency inverter off and then back on		
251	Disc: Wrong ENC_INC	**Error:** In the parameter ENC_INC an invalid value was configured **Remedy:** Configure correct value in the parameter ENC_INC.		
252	Disc:EncInc deviance	**Error:** During the continuous automatic updating of the encoder line number, an implausible value was determined. **Remedy:** Switch frequency inverter off and then back on		
253	Disc:Wrong position!	**Error:** Error occurs if the Hall sensor detects a magnet at a time earlier than expected. **Remedy:** Switch frequency inverter off and then back on		
260	V_EXT active!	**Error:** An error occurs if in the case of the available mains connection voltage the external 24 V power supply exceeds the internal power supply by 1 V. **Remedy:** Unplug the connecting lead of the external 24 V power supply.		
270	Cable change warning	**Error:** Information travel direction change counter Replacement of the cables in about 1 year		
280	S31 too long	**Error:** the calculated deceleration path S31 is too long **Remedy:** in the "Decelerate" menu, increase the deceleration "A_NEG" or reduce the round offs "R_NEG1" and "R_NEG2		•
285	Installation:V*=0	**Error:** V* in the "Installation data" menu has not been assigned **Remedy:** Check the parameter in the "Installation" menu		
287	V1 . . . V7 > V*!	**Error:** One of the travelling speeds V_1 ... V_7 entered is larger than the entered rated speed V* **Remedy:** Configure speeds V_1 … V_7 in the "Travel" menu to ≤ V*		

Error no.	Error text	Error cause	M	S
288	V_3 > V*	**Error:** The traveling speed V_3 entered is larger than the entered rated speed V* **Remedy:** Set speed "V_3" in the "Travel" menu to ≤ V **Info:** Error is deactivated in CAN mode. If speed values are entered that are greater than V*, the ZAdyn automatically limits the speeds to V*.	•	•
289	V_1 < V_2 < V_3!	**Error:** Speeds in the "Travellingl" menu are incorrectly set **Remedy:** In the "Travel" menu, make sure that V_1 < V_2 and V_2 <V_3	•	•
290	ParaSet2 empty!	**Error:** Activated parameter set 2 does not contain any data **Remedy:** In the "Parameter set 2" menu, copy the the data from parameter set 1 to parameter set 2		•

Error 3xx

- Error before trip start

Error no.	Error text	Error cause	M	S
301	MOP: Timeout	**Error:** No communication between the application processor and the motor management processor during start due to an error during the update **Remedy:** Perform a software update	•	•
303	MOP: SW-Error	**Error:** Software error message in the motor management processor **Remedy:** Perform a software update	•	•
304	MOP: HW-Error	**Error:** Hardware error message in the motor management processor	•	•
305 306	ADC calibration??	**Error:** Zero point offset in the motor current detection (analogue digital converter) is outside the tolerance **Remedy:** Replace defective shunt module		•
307	Iu Iv Iw > 1.0A	**Error:** Defective current measuring the phase U, V or W **Remendy:** Check the connector of the Shunt-Modul Current sensors are defekt	•	•
310	No abs.enc	**Error:** Connected absolute value encoder not detected (no absolute value encoder connected when frequency inverter was switched on) **Remedy:** Check absolute value encoder connection Switch frequency inverter off and then back on Parameter im Menü "Encoder & BC" überprüfen		•
315	EnDat: HW-error	**Error:** EnDat encoder delivers error		•
316	EnDat: Resolution	**Error:** Configured resolution in the EnDat encoder does not match the EnDat encoder resolution **Remedy:** Configure the correct EnDat encoder resolution in the "Encoder & BC" menu		•
320	ENC: Error-start	**Error:** Configured sinusoidal encoder was not detected **Remedy:** Check connection Check the rotary encoder type; possibly connect an encoder with rectangle signals	•	•
321	EnDat: ULP-error	**Error:** While starting, an error was read out from the EnDat encoder. Error is stated as a code: 0: faulty EnDat encoder power supply 1: no SSI communication 2: faulty EnDat encoder lighting 3: defective signal amplitude 4: Positioning error 5: defective sine evaluation **Remedy:** Check connection, check EnDat encoder		
322	EnDat: Com-Fehler	**Error:** During start, malfunction in communication to EnDat encoder; absolute value could not be read out **Remedy:** Check EnDat encoder, Check rotary encoder line Check the rotary encoder configuration in the "Encoder & BC" menu		

Error no.	Error text	Error cause	M	S
324	SSI: Ack-Error	**Error:** During start, malfunction in communication to SSI encoder; absolute value could not be read out **Remedy:** Check SSI encoder, Check rotary encoder line Check the rotary encoder configuration in the "Encoder & BC" menu		
325	SSI: Timeout	**Error:** Faulty communication with SSI encoder during start-up; absolute value could not be read out, SSI encoder does not reply **Remedy:** Check SSI encoder, Check rotary encoder line Check the rotary encoder configuration in the "Encoder & BC" menu		
327	ENC: Read-Error	**Error:** During reading out the position of the absolute encoder (position will be read out repeatedly) different values will be read. **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
328	ENC: Count-Dif	**Error:** Excessive difference between the position determined by the absolute value encoder and the position calculated from the absolute value encoder impulses **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
329	ENC:Sinus-Error S	**Fault:** Plausibility between sine and cosine track of sinus encoder unsatisfactory **Remedy:** Check sinus encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
330	ENC:Sinus-Error F	**Fault:** Plausibility between sine and cosine track of sinus encoder unsatisfactory Number of tests can be set in the menu "S9_ZA-Intern/ENC_CHK". The factory setting ENC_CHK=4 corresponds to a check duration of approx. 1 ms. **Remedy:** Check sinus encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
331	ENC: Error NDEF	**Error:** Start-Bit of the EnDat-protocol is not detected **Remedy:** Check EnDat encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
332	ENC: 1387 CD=0	**Fault:** input voltages of signal tracks C and D of absolute value encoder type ERN1387 areboth zero **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection		
340	ENC:magnet miss.	**Error:** Occurs if a magnet is not detected in an expected position and also within the tolerance range. **Remedy:** Stick on the magnet in the right position In case the magnet was lost, stick on the lost magnet Set the Hall sensor to the correct distance Check if there is play on the driving disk disassembly		
372	ENC:No Abs.value	**Error:** Absolute values cannot be read in by the rotary encoder prior to starting travel **Remedy:** Check rotary encoder connection		•
373	ENC:No Abs.End	**Error:** Absolute values cannot be read in by the rotary encoder prior to starting travel **Remedy:** Check rotary encoder connection		•
374	P1P2:short-circuit	**Fault:** with parameterised motor temperature monitor "P1P2=PTC" the resistance at the input P1P2 is < 20 ohms **Remedy:** Check connected motor temperature monitor Check parameterised sensor type in "Monitoring/P1P2" menu Short-circuit at the X-MT:P1P2 is not permissible	•	

Error no.	Error text	Error cause	M	S
375	MOT:Temp.warning	**Fault:** motor temperature monitoring has responded at a standstill **Remedy:** Check the temperature sensor connection Remove the cause for the rise in the motor temperature	•	•
377	BRxx:Temp.warning	**Error:** The continious braking power of the Brake resistor is exceeded by 150 % within 120 s A restart will be avoided **Remedy:** Check the configuration of the BR-type Check the connected BR	•	•
378	MP: Not active!	**Fault:** Mains supply of the power section not active		•
379	MP:Temp.warning	**Error:** during startup, the temperature on the power stage is too high **Remedy:** Frequency inverter is overloaded, repair the cause for the overload	•	•
380	BR: Start-Error	**Error:** When the brake monitoring is activated, at least 1 brake monitoring contact is not connected or is incorrectly connected **Remedy:** Check the functioning (NO or NC) in the monitoring contacts, check the configured number and function of the monitoring contacts in the "Monitoring" menu, check the connection of the monitoring contacts		•
385	DCP: Init fail	**Error:** Frequency inverter has not received any initialisation data from the control (for DCP03 & DCP04) **Remedy:** Check the DCP line connection, Check the type of triggering control in the "Control system" menu Check the elevator control system		•
395	MP:ERR_EXT active	**Error:** Internal defect of the device, overcurrent in the power stage	•	•

Error 4xx

- Travel abort to protect the ZAdyn4C
- Voltage monitoring
- Overvoltage Brake resistor / Brake-Chopper
- Power stage temperature recording
- Current monitoring

Error no.	Error text	Error cause	M	S
410	ADC: Over current!	**Error:** Maximum modulation of the analogue current converter, motor current too high **Remedy:** Check the connection at the frequency inverter output for short-circuit, Check rotary encoder connection for connection of rotary encoder tracks, check the phase position (URU; VRV; WRW), Check motor data in the "Motor name plate" menu, Decrease "SPD_KP" amplification in the "Control system" menu, Reduce amplification during start "K_START" in the "Start" menu		•
412	MOT:UVW fail	**Error:** Motor test current not correct **Remedy:** Check the motor connection Check the motor contactors (see also "Special functions" chapter)	•	
415	MOT: Current UVW	**Error:** Motor fault current, earth fault **Remedy:** Check the motor connection Check rotary encoder connection	•	•
420	MP: Temp. Fault	**Error:** Excess heat in the power stage **Remedy:** Check the fan, check the ambient temperature, When installing the frequency inverter in the switch cabinet, ensure it has sufficient ventilation	•	•

Error no.	Error text	Error cause	M	S
421	STO: Temp. alarm	**Error:** Overtemperature internal electronics **Remedy:** Check the fan, check the ambient temperature, When installing the frequency inverter in the switch cabinet, ensure it has sufficient ventilation **Info:** Error only occurs in ZAdyn4C of frame sizes 040-074	•	•
431	MP: PWM fail	**Error:** The pulse width modulation of the clock frequency is not switched on or off **Remedy:** Check rotary encoder connection	•	•
450	MP: Overload!	**Error:** Nominal current of the frequency inverter was exceeded for 10 s by a factor of 1.8 **Remedy:** Check motor data Check calculation Check the weight compensation	•	
470	DC: U < UDC_MIN	**Error:** Intermediate circuit has undercut the permissible value for "UDC_MIN" (Menu "Power section") during travel **Remedy:** Check the setting for the "UDC_MIN! value in the "Power section" menu, Check the frequency inverter design, Check the motor data Voltage drop during the travel Check the input phases	•	•
471	DC: U > UDC_MAX	**Error:** Intermediate circuit has undercut the permissible value for "UDC_MAX" (Menu "Power section") during travel **Remedy:** Check the setting for the "UDC_MAX! value in the "Power section" menu, Check the connection / functioning of the brake chopper / brake resistor Parameter im Menü "Encoder & BC" überprüfen, Check the size of the Brake-Chopper / Brake-Resistor,	•	•
475	DC: U > 850 V	**Error:** During travel, the intermediate circuit voltage exceeds 850 VDC **Remedy:** Check the connection / functioning of the brake chopper / brake resistor, Check the size of the Brake-Chopper / Brake-Resistor, Check selection of brake chopper / brake resistor in chapter "Encoder & BC/BC_Type"		•
480	MP: Overcurrent!	**Error:** In one motor phase, overcurrent was measured **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check the "SPD_KP" parameter in the "Control system" menu,		•
481	MP: Overcurr. CO	**Error:** in at least 1 open motor contactor monitoring-contact (contactor monitor on X-CO not triggered), overcurrent was measured in one motor phase **Remedy:** Check the contactor monitoring Check the contactor wiring		•
485	Intermediate circuit overcurrent	**Error:** Overcurrent was measured in the intermediate circuit **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check brake chopper/brake resistor connection, Check the "SPD_KP" parameter in the "Control system" menu,		•
490	MP: UCE -Alarm	**Error:**The IGBT monitoring was activated due to high motor current **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check the "SPD_KP" parameter in the "Control system" menu,		•
491	MP: UCE -Alarm CO	**Error:** in at least 1 open motor contactor monitoring-contact (contactor monitor on X-CO not triggered), the IGBT monitoring was activated due to high motor current **Remedy:** Check the contactor monitoring Check the contactor wiring		•

Error 5xx

- Trip abort to protect the installation
- Speed monitoring
- STO function monitor
- Contactor monitor (optional)
- Monitoring of Brake resistor / Brake-Chopper
- Motor temperature monitoring

Error no.	Error text	Error cause	M	S
501	Travel at MB=OFF	**Error:** Machine moves with deactivated MB output occurs if the brake is opened manually occurs if the brake is opened manually, **Remedy:** Check the brake functioning	•	•
502	ENC:Sin-Enc.fail	**Error:** Rotary encoder sinus signal was detected at standstill **Additional information:** The maximum output voltage of the frequency inverter was reached at the time of the error **Remedy:** Check the brake functioning Check rotary encoder connection	•	•
503	No starting	**Error:** No rotary encoder signal was received after expiration of the time T_ENC (T_ENC is started with T_2) **Remedy:** Check rotary encoder function, Check rotary encoder connection, Check the brake lifting Check the time "T_ENC" in the "Monitoring" menu Check the times "T_2" and T_3" in the "Start" menu	•	•
504	ENC: Sig.Int.	**Error:** Frequency inverter does not receive a rotary encoder signal at a target speed >10 cm/s **Remedy:** check motor connections (U R U; V R V; W R W), Brake not closed during start, Check the motor data Check rotary encoder connection, Increase the "SPD_KP" parameter in the "Control system" menu,	•	•
505	MB/ENC fault	**Error:** Frequency inverter does not receive a rotary encoder signal at a target speed >10 cm/s **Additional information:** Motor current in A **Remedy:** check motor connections (U R U; V R V; W R W), Brake not closed during start, Check the motor data Check rotary encoder connection, Increase/reduce the "SPD_KP" parameter in the "Control" menu	•	•
506	X_ENC15:Discon.	**Error:** Rotary encoder signal interruption during travel **Remedy:** Check rotary encoder connection, Switch frequency inverter off and then back on		
515	v > 110% V*	**Error:** Actual speed is ≥ 110% of the nominal speed V* **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu,	•	•
516	v > 150% V*	**Error:** Actual speed is ≥ 150% of the nominal speed V* **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu,	•	•
518 519	Speed too low	**Error:** The actual speed deviates from the target speed by -15% **Remedy:** Check rotary encoder connection, Check the rotary encoder impulses in the "Info" menu, page 11, Check the brake lifting Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Increase "SPD_KP" amplification in the "Controller" menu	•	•

Error no.	Error text	Error cause	M	S
520	Wrong direction	**Error:** Machine moves more than 12 cm in the wrong direction **Remedy:** Check rotary encoder connection, Check the rotary encoder configuration in the "Encoder & BC" menu, check the motor connections (URU; VRV; WRW) Frequency inverter design too small	●	●
522	ENC: Dif. pos.	**Error:** Excessive positive difference between the rotary encoder counter statuses of two sampling steps. The limit value corresponds to double the nominal system speed **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu, Check the motor connection	●	●
523	ENC: DIF. neg.	**Error:** Excessive negative difference between the rotary encoder counter statuses of two sampling steps. The limit value corresponds to double the nominal system speed **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu, Check the motor connection	●	●
525	ENC: 1387 ADC Limit	**Fault:**signal track A or B of the absolute value or sinus encoder exceeding permitted limit value during travel Fault entry not made until end of travel Travel not cancelled **Remedy:** Check sinus encoder, Check the optional board for rotary encoder connection, Check the rotary encoder type in the "Encoder & BC" menu,	●	●
529	Quickstart alarm	**Error:** During a quick start function, the machine moves more than 7 mm while input "V=0" is triggered **Remedy:** Check the parameter in the "Motor name plate" menu, Shorten time during which input "V=0" is triggered, check the motor connections (URU; VR V; WR W)	●	●
530	STO: remains	**Error:** At the start of travel there is no signal at the STO_A and STO_B inputs at the end of the time T_SDLY. **Remedy:** Check activation of the STO inputs	●	
531	STO: Interruption	**Error:** STO input signals are interrupted for longer than 200 ms during travel **Remedy:** Check activation of the STO inputs, check safety circuit	●	
532	STO: missing	**Error:** At the end of travel there is still a signal at the STO_A and STO_B inputs at the end of the time T_SDLY. **Remedy:**check control of the STO inputs, adjust the time at the elevator control during which the STO inputs are controlled		
533	STO: Fault	**Error:** The status of the STO_A und STO_B signals was different for longer than 120 ms. **Remedy:** Check activation of the STO inputs	●	
534	STO: No travel signal	**Error:** At standstill (no travel signal) the STO inputs were set and there was no valid travel signal within the time T_SDLY. **Adjustment:** Check activation of the STO inputs, check safety circuit, check activation of the travel signals		
535	ZR:RDY abort	**Error:** The signal at the digital input set to "ZR_RDY" drops out during travel **Remedy:** Use the ZArec display to check for an error at the ZArec		
536	SBC:RDY abort	**Error:** The digital input with the "SBC_RDY" function is de-energized during travel or is not set at the start of travel. **Remedy:** See "Error diagnosis" chapter in the operating instructions of the ZAsbc4C.		

Error no.	Error text	Error cause	M	S
540	CO: ON!?	**Fault:** No signal is available at the end of the contactor monitoring time T_CDLY **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control check the power supply of the motor contactors , Check the power-supply of the contactor monitoring, Check contactor switch-on time "T_CDLY " in the "Monitoring" menu, Check the contactor monitoring in the "Monitoring" menu **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).		●
544	CO/RF:Vx activ!	**Error:** 300 ms after switching off the digital outputs RB and MB due to a RF- or CO-interrupt, the travel comands of the elevator control are still activated **Remedy:** Use the control to check the evaluation of the frequency inverter output signal	●	
545	CO open early	**Error:** Motor contactors are open during travel **Remedy:** Check the motor contactor triggering Check the safety circuit **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).	●	
546	CO: open early M	**Error:** Motor contactors are open during travel **Remedy:** Check the motor contactor triggering Check the safety circuit	●	
548	CO1: still on	**Error:** 5s after expiration of T_CDLY, a signal is still present on the contactor monitor input CO1 **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control		●
549	CO12: still on	**Error:** 5s after expiration of T_CDLY, a signal is still present on the contactor monitor input CO1 or CO2 **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).		●
550	MOT: Overload !	**Error:** Motor current exceeds the value max for time Tmax **Remedy:** Check the parameter in the "Motor name plate" menu, Check the weight compensation Check the brake switching function	●	●
560	V > VZ	**Error:** Actual speed exceeds the specified nominal speed for readjustment when readjusting. **Info:** inverted Function Error is displayed if entered in mask At **CONFIG: 31:KL_IO** the function is entered in the mask automatically.	●	
570	PFU: Fault	**Error:** Monitor contact of the power feedback unit opens during operation of the ZAdyn4C **Remedy:** Check connection of the feedback unit function monitor, Check function monitor of power feedback unit, Check the function of the power feedback unit The error is automatically acknowledged when the monitor contact of the power feedback unit reconnects.		●
571	PFU:Stdby remains in place	**Error:** PFU is not yet active 1 s after start of travel	●	

Error no.	Error text	Error cause	M	S
575	MOT: Temp. -Alarm	**Error:** Motor temperature monitor triggered during the trip (error evaluation only if error no. 575 is entered in the mask function) **Remedy:** Check the parameter in the "Motor name plate" menu, check the motor's duty cycle, check the motor for winding short, Check rotary encoder, Check the brake function	•	•
582	BR:T2 too small	**Error:** Brake does not open within time T2 (only active if brake monitor is switched on) **Remedy:** Check the brake triggering, check the brake opening time, check the configured brake opening time "T_2" in the "Start" menu and increase if necessary		•
583	BR: Fault Travel	**Error:** Brake monitoring contacts triggered during travel **Remedy:** Check the brake triggering, check the monitoring contacts, check the power supply of the brakes **Info:** • Negated function: If entered in the mask, the error leads to immediate stop of travel • Error does not lead to blocking of ZAdyn with parameter LOCKBR="ON"	•	•
584	BR: Fault Travel	**Error:** Brake monitoring contacts triggered during travel Fault message at end of travel with additional information = 0: Brake monitor contacts have switched during travel but the brake was not closed Fault message without immediate interruption of travel and additional information ≠ 0: Brake was closed during travel **Additional information:** Indicates consequential fault **Remedy:** Check the brake triggering, check the monitoring contacts, check the power supply of the brakes **Info:** Error does not lead to blocking of ZAdyn with parameter LOCKBR="ON"	•	•
585	BR: T5 too small	**Error:** Brake does not close within time T5 (only active if brake monitor is switched on) **Remedy:** Check the brake triggering, check the brake closing time, check the configured brake opening time "T_5" in the "Stop" menu and increase if necessary		•
586	BR: Stop-Error	**Fault:** Monitoring contact of the brake briefly signals "Brake closed and then "Brake open" again longer as the time T5 (only active with the brake monitor switched on) **Remedy:** Check the brake triggering, check the brake closing time, check the configured brake opening time "T_5" in the "Stop" menu and increase if necessary		
590	RV1/RV2:Change	**Fault:** Change the direction specification during active travel **Additional information:** Display of the set direction 1 = RV1 3 = RV2 **Remedy:** Check control of travel directions	•	•

Error 7xx

1. Trip abort due to errors between ZAdyn4C and control system

Error no.	Error text	Error cause	M	S
710	DCP: Timeout	Error: DCP communication interrupted during travel **Remedy:** check wiring (shields)	•	•
715	DCP: G0-G7 fail !	**Error:** Transmission error in the DCP protocol: Telegram for the speed preset (G0-G7) not received **Remedy:** Possibly the DCP-function of the elevator control is not compatible	•	•
720	DCP: Delay fail	**Error:** The DCP residual path increases during deceleration by more than 5cm **Remedy:** Check the absolute rotary encoder for its residual path determination Wrong residual path signal from open loop control	•	•
721	DCP: Dist. fail	**Fault:** There is no change in the residual path for 200 ms during the run **Remedy:** Check the absolute rotary encoder for its residual path determination Wrong residual path signal from open loop control	•	•
722	DCP: s_rest = 0?	**Error:** Residual path > 20mm jumps to 0mm **Remedy:** Check the absolute rotary encoder for its residual path determination Wrong residual path signal from open loop control	•	•
723	DCP: s_rest < 0!	**Error:** A negative residual path is transmitted during travel Remedy: Check the DCP wiring	•	•
780	DCP: Quick Start >20s	**Error:** In the quick start function, input "V=0" is triggered for over 20s **Remedy:** Shorten the time in which "V=0" is triggered	•	•
781	v0 at travel ?!l	**Error:** Input "V=0" is triggered during travel **Remedy:** Check the triggering of "V=0"	•	•
799	RF:Failure	**Error:** Control enable RF was switched off during travel (error evaluation only if error no. 799 is entered in the error mask) **Remedy:** Check the triggering of "RF"	•	•

Error 8xx

2. Errors which can occur in operation with CANopen Lift

If an error occurs during operation with CANopen, the frequency inverter runs through status "ST_De-lay" and finally goes to status "Check ST release". The frequency inverter remains in this status until the control sends the command "Fault Reset".

Error no.	Error text	Error cause	M	S
800	CAN: Timeout	**Errors in Velocity Mode:** Heartbeat from control system is missing or at wrong time. **Errors in Position Mode:** Heartbeat from control and/or rotary encoder missing or does not occur at the set times. **Adjustment:** Check CAN-connection Check if devices have the right heartbeat.	•	
810	CAN: Quick Stop Det.	**Error:** Control system activates a quick stop.		
820	CAN: Illegal Status	**Error:** Control sends commands to the frequency inverter in the wrong order. **Adjustment:** Take care to the right order in CAN drive cycle	•	
830	CAN: Timeout Enab.-Det.	**Error:** Control system gives command "Enable Operation" not within T_CMD **Adjustment:** Control system gives command "Disable Operation" not within T_CMD Increase time for T_CMD		
831	CAN: Timeout Dis. Op.	**Error:** **Adjustment:** Increase time for T_CMD		

Error no.	Error text	Error cause	M	S
832	CAN: Timeout Shut-down	**Error:** Control system gives command "Shutdown" not within T_CMD. Occurs by closing the brakes. **Adjustment:** Increase time for T_CMD		
833	CAN: Timeout Dis. Vol.	**Error:** Control system gives command "Disable Voltage" not within T_CMD. Occurs at end of travel. **Adjustment:** Increase time for T_CMD		
840	CAN: ENC. Info missing	**Error:** The object "Encoder Info" was not written to the frequency inverter by the control		

Error 9xx

- Fatal error, which can only be acknowledged by switching off the ZAdyn4C

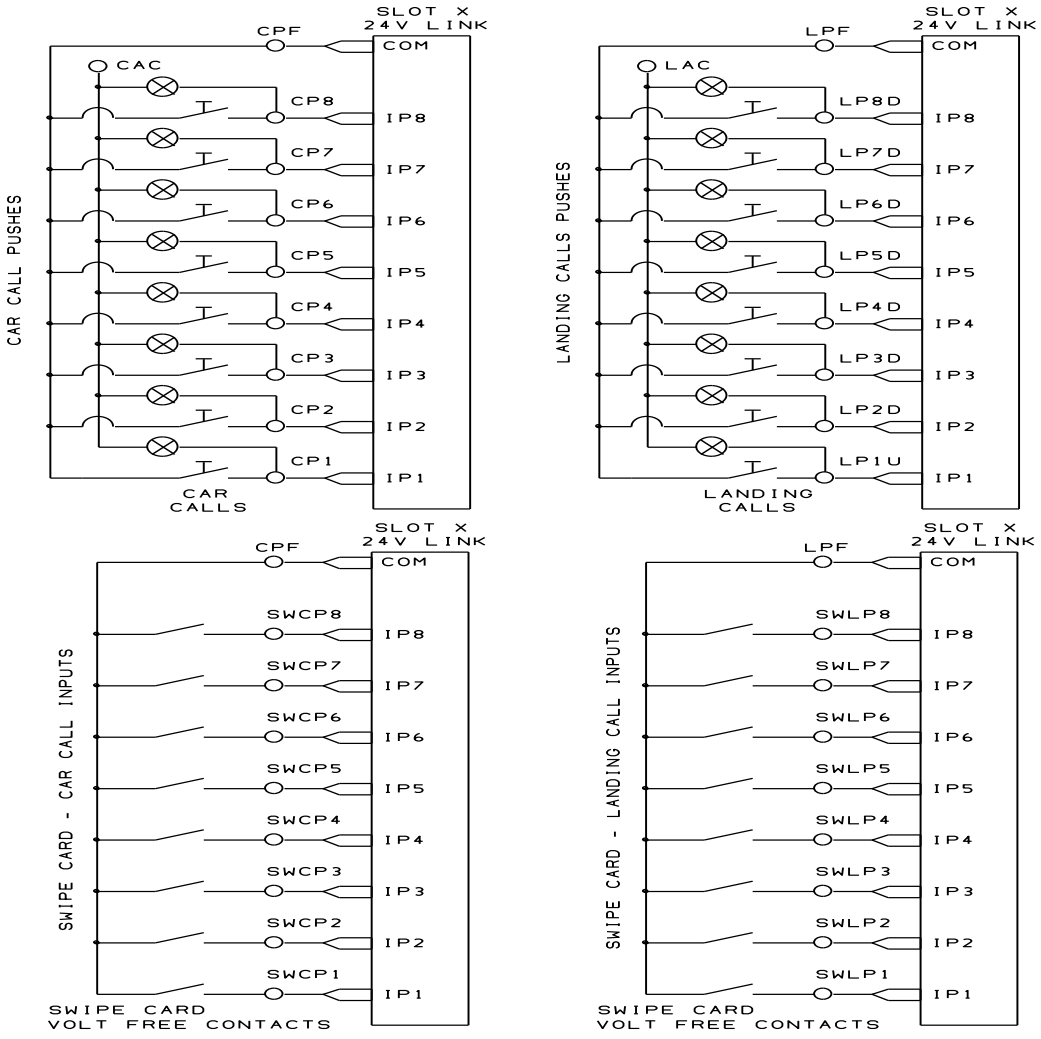
Error no.	Error text	Error cause	M	S
905	MOP:HW-SW Error	**Error:** Hardware or software error occurred after switch-on. After 60 s, the frequency inverter switches to "Wait-Switch off" **Remedy:**Check the connectors between the Control Unit and Modul Print check the fuse on the Switching Power Print no Modul Print existing check EEprom on the Modul Print	•	
906	ZR:ERR by start	**Error:** No signal at BC input during ZAdyn4C start-up **Remedy:** Check wiring Use the ZArec display to check for an error at the ZArec		
908	PFU: No function	**Error:** When switching on the frequency inverter, the monitor contact of the power feedback unit is not closed **Remedy:** Check connection of the feedback unit function monitor, Check function monitor of power feedback unit, Check field of rotation of the mains connection for the power feedback unit		•
910	BC: No function	**Error:** When switching on the frequency inverter, the monitor contact for the brake chopper or brake resistor is not closed **Remedy:** Check the temperature monitor for the Brake-Chopper or Brake resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor, Check whether there is a voltage of 24VDC at the connection terminal X-IN between +24V_IN and GND_IN.		
911	BRxx: Overload	**Error:** The continious braking power of the Brake resistor is exceeded by 150 % within 120 s The frequency inverter switches off during travel **Remedy:** Check the configuration of the BR-type Check the connected BR	•	
912	BC: Fault	**Error:** Monitor contact for brake chopper or brake resistor opens during frequency inverter operation **Remedy:** Check the temperature monitor for the Brake-Chopper or Brake resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor,		
913	DC: U_DC>U_BC	**Fault:** at a standstill, the voltage measured at the intermediate circuit (+DC/-DC) after 5 s is higher than trigger voltage U_BC **Remedy:** Defective analysis of the DC-link voltage U_DC The synchronous motor is operated without motor contactors and driven by an external load	•	
914	X-ENC15:Miss.	**Error:**No rotary encoder detected at X-ENC15 when switching on the frequency inverter **Remedy:** Check rotary encoder connection, Reset frequency inverter		

Error no.	Error text	Error cause	M	S
916	X_ENC15:Discon.	**Error:** Rotary encoder signal interruption during travel **Remedy:**Check rotary encoder connection, Switch frequency inverter off and then back on		
917	BRxx activ	**Error:The internal transistor for the brake resistor is still activated** 5.5 s after end of travel	•	
918	MP:Temp.missing	**Error:** Temperature detector on power stage is not supplying any measure-ments **Remedy:** Change the device Check fuse on SP board		•
919	ZR:ERR by opera.	**Error:** Signal at BC input drops out during travel **Remedy:** Use the ZArec display to check for an error at the ZArec		
920	MOP:ERRNMI active	**Error:** Overcurrent during standstill **Remedy:** Check the brake chopper / brake resistor wiring	•	
930	MP: UCE Alarm BR	**Error:** The voltage monitoring of the transistor of the Brake resistor has triggered (Overcurrent of the electric circuit of the Brake resistor) **Remedy:** Check wiring of the Brake-Resistor Check Brake-Resistor Check whether the correct type is configured in the "Encoder & BC/BC_Typ" menu		•
931	MP:ERR_EXT active	**Error:** internal error message of the output stage **Remedy:** Switch frequency inverter off and then back on Replace the device (only after consultation of the Ziehl-Abegg-Hotline)		•
950	TD_CNT: Drive Limit	**Error:** Number of maximum drives reached! Only one travel with the actual rope remains. **Remedy:** Change ropes and reset the down counter. One journey is possible after resetting the ZAdyn4C.		•
960	STO: Diagnostic	**Error:** The status of the STO_A und STO_B signals was different for at least 310 ms so that the internal diagnostic unit performed a switch-off. **Remedy:** Check activation of the STO inputs. Error can only be reset once the ZAdyn4C is switched off.		•
961	STO: Hardware	**Error:** Internal hardware error **Remedy:** Error can only be reset once the ZAdyn4C is switched off.	•	•
991	MOP: Timeout	**Error:** The communication between the processors was interrupted or the communication between the processors is faulty during travel. **Remedy:** Make sure that the EMC regulations are observed (see chapter "Electrical Installation / EMC-conform Installation")	•	•
994	MOP: Timeout 2	**Error:** I standstill the communication between the Motor-Management-Pro-cessor (MOP) and the Application-Processor (APP) is interupped for more than 7.5 s Increased BR-protection	•	
995	ENC:1387 CD-Lim	**Fault:** signal track C and/or D of absolute value encoder type ERN1387 exceeds permitted limit value before travel starts **Remedy:** Check absolute value encoder Check the optional board for rotary encoder connection Error can only be reset once the ZAdyn4C is switched off	•	•

24) Access Control Card Reader (Swipe Card) Interface

Swipe Card Control is selected by asserting additional “Swipe Card Inputs”, therefore an extra set of Swipe Card Inputs for both Car and Landing Calls are required. Interfacing to the Swipe Card system (Usually fitted in the machine room) is achieved directly with the lift controller, as opposed to additional wiring within Lift Car and Lift Shaft.

1) Swipe card Input Requirements:
    a. Individual volt free inputs for each Car and Landing Call as detailed below.
2) Swipe Card Operation:
    a. Car and Landing calls are inhibited until the swipe card input is asserted.
    b. The swipe card input is asserted for 2 seconds typically when the card is swiped.
    c. Once the Car / Landing call is latched, the call remains operational for quick close and constant pressure door control.
    d. Swipe call inputs are overridden During “FIRE” control.
3) Swipe Card Parameters:
    a. SPECIAL SERVICE 2->SWIPE CARD CONTROL
        i. YES = Enable Swipe Card Control, NO = Disable Swipe Card Control
    b. FIRE SETUP->FIRE INHIB SWIPECARD
        i. YES = Inhibit Swipe Card Control when on Fire.
        ii. NO = Do not Inhibit Swipe Card Control when on Fire.



25) Installation Mode

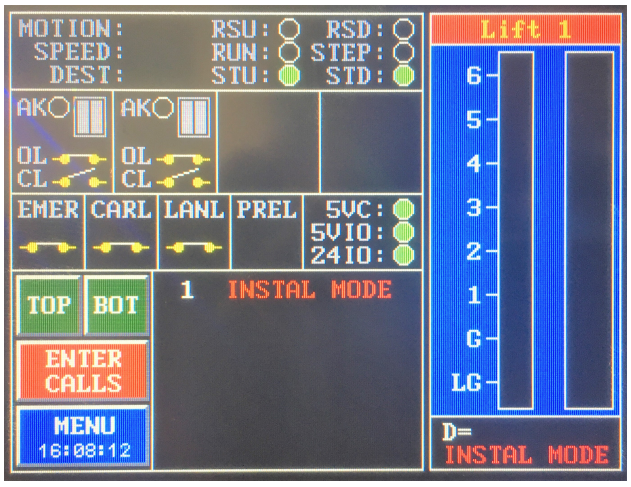
Installation Mode allows the lift to operate on inspection without monitoring restrictions. This is intended for when the lift installation is at a very early stage and lift car isn't yet complete (e.g. no door operator / lift car interior etc.). Pre-Flite checks and monitoring functions are therefore overridden on Inspection as below:

1) Pre-Flite Checks associated with the Door Open and Door Close Limits (also secondary car gate check)
2) Car gate monitoring
3) Uncontrolled Movement checking
4) Rope Reversal Monitoring (rope wear due to excessive Machine operations / reversals)
5) Brake Test Mode / Fault

Once the lift is in installation mode it cannot be switched into normal service until it is switched off installation mode.

Installation Mode Parameters:
1) GENRAL SETUP->INSTALLATION MODE
    i. YES = Installation Mode Enabled
    ii. NO = Installation Mode Disabled

When on Installation Mode the LCD display will indicate this as below:



26) Maintenance Monitoring Options

Press Menu -> Parameters -> Right Arrow Twice then select **Maintenance Setup** for Maintenance Parameters as below.

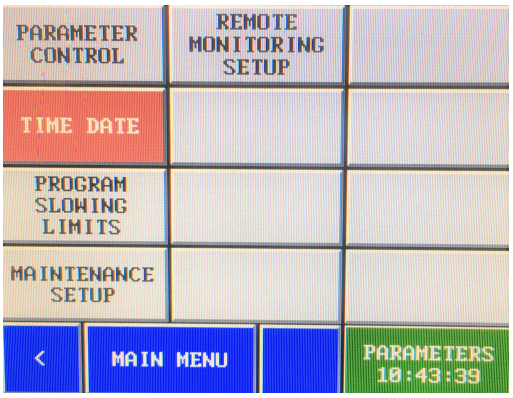


Fig 26.1

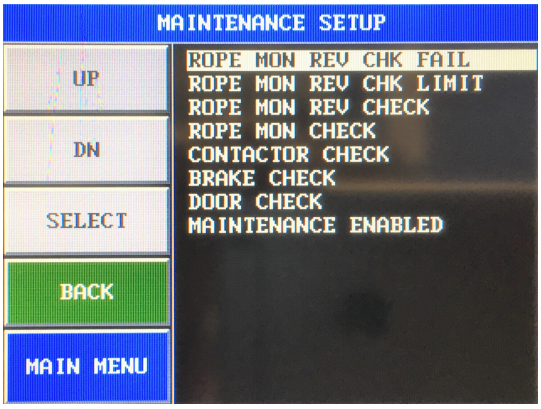


Fig 26.2

ROPE MON REV CHECK FAILURE (YES / NO)
YES = Number of rope reversals is exceeded.
Number of reversals is >= ROPE REVERSAL CHECK LIMIT (1.1 Million Typically).
The lift will be out of service until a manual reset is carried out by a competent person.

ROPE MON REV CHECK LIMIT (0 to 4,294,967,295)
Number of rope reversals before the lift is out of service (1.1 Million Typically).

ROPE MON REV CHECK (0 to 4,294,967,295)
Number of rope reversals before a warning is given prior to the lift going out of service.
Once this value is exceeded a flashing warning will be given on the Almega 2 display.

CONTACTOR CHECK (0 to 4,294,967,295)
Number of contactor operations before a warning is given.
Once this value is exceeded a flashing warning will be given on the Almega 2 display.
The lift will NOT go out of service.

BRAKE CHECK (0 to 4,294,967,295)
Number of Brake operations before a warning is given.
Once this value is exceeded a flashing warning will be given on the Almega 2 display.
The lift will NOT go out of service.

DOOR CHECK (0 to 4,294,967,295)
Number of Door Cycles (opened / closed) operations before a warning is given.
Once this value is exceeded a flashing warning will be given on the Almega 2 display.
The lift will NOT go out of service.

MAINTENANCE ENABLED (YES / NO)
YES = All Maintenance features are enabled as per their settings
NO = All Maintenance features are disabled.

Note: a **'0'** in each of the features above means that feature is disabled also.

Press Menu -> Right Arrow Twice then select Maintenance Viewer to show the maintenance status as below: When the circle is fully RED, the number of operations has exceeded. To reset any option, press the circle and press the RESET button.

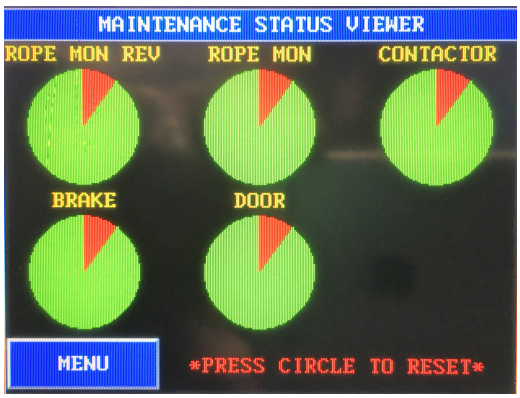


Fig 26.3

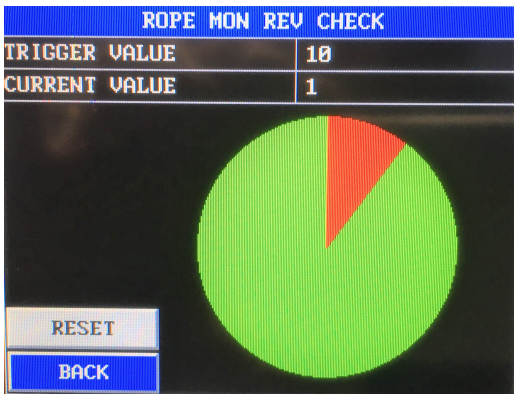


Fig 26.4

Example: Rope Reversal Monitoring setup (as below)
The Rope Monitoring Reversal Check Warning is set to 100,000 operations (*Fig 26.5*).
The Rope Monitoring Reversal Check Failure is set to 1.1 Million operations (*Fig 26.6*).

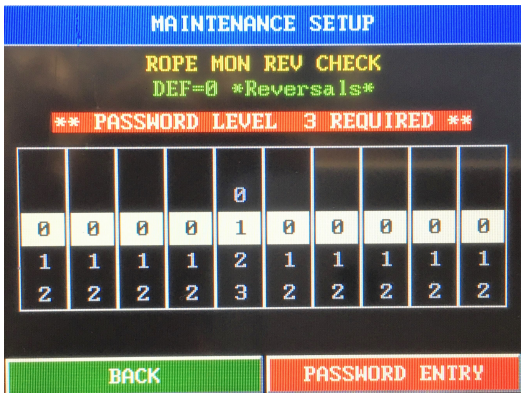


Fig 26.5

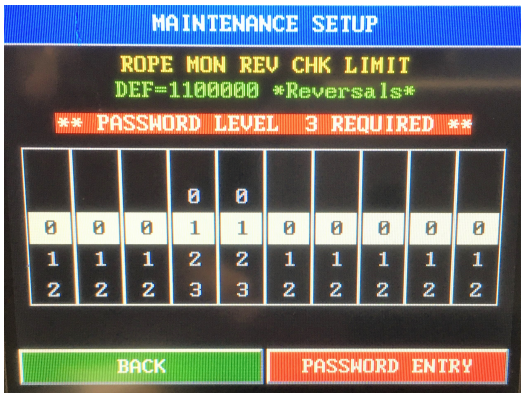


Fig 26.6

After 100,000 operations a "Maintenance Required" warning will be given as (*Fig 26.7*) below. Then after 1.1 Million operations the lift will be taken out of service as (*Fig 26.8*) until a manual reset is carried out by a competent person.

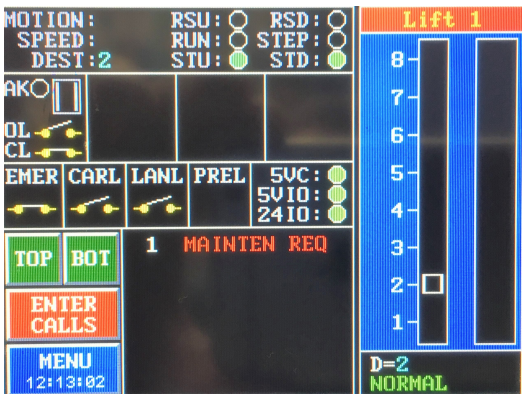


Fig 26.7

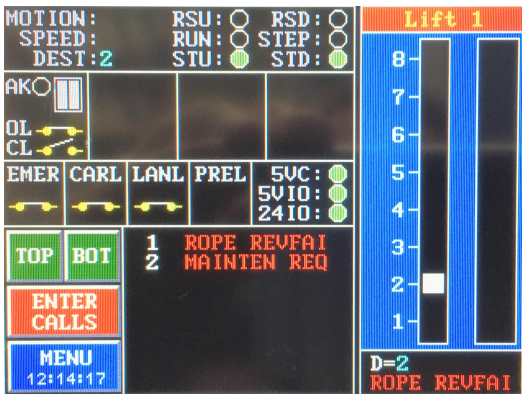


Fig 26.8

To reset the Rope Reversal Check Failure, Press Menu->Engineers' Selection and find ROPE MONITORING REV FAIL as below. Change the status from YES to NO by pressing the box marked NO. Password Level 3 is required to reset this failure.

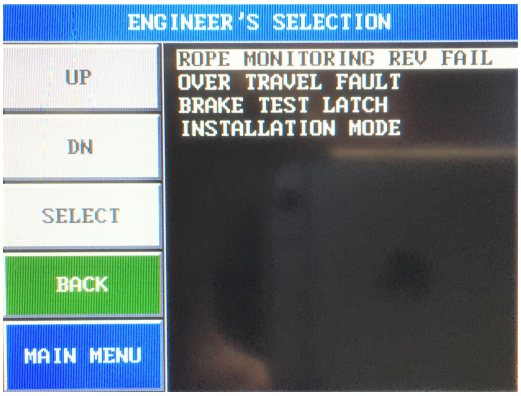


Fig 26.9

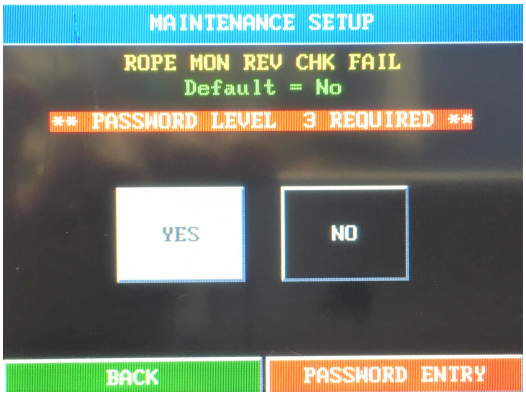


Fig 26.10