QUBE CONTROLLER

TRAINING NOTES

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System Overview

Qube Micro – Top Enclosure

Qube Power – Bottom Enclosure

Qube RIO – Remote IO
Mounted on Lift Cabin

System Overview

The Qube Control system is based on 3 main components :-

Qube Micro

Housing the Main Control Board (PLC) System Power supply distribution and the majority of the site Connections including 3 CAN Bus Networks, 16 x 110VAC Inputs, 8 x 24VDC Inputs and 24 x Relay outputs, with HMI LCD.

It also Houses the Safety card used to Bridge the Lock circuit when Pre-Opening is enabled.

The Qube Micro Main Control Board provide 3 Exclusive Isolated CAN bus Networks dedicated to Shaft and Landing features

Connected to the Terminal rail.

The Micro also houses the EMOP (Emergency operation Pendant/Panel Test control)

Qube Power

The Qube Power contains the In coming Mains 415V supply Motor Inverter Drive and main Switchgear.

The Two Enclosures are joined with a Multipole Connector in the Top Right hand side of the Power Enclosure.

Qube RIO

Located on top of the Lift Cabin and is used for all Cabin related signals e.g. COP , Door Operator feedback,

Cartop Test Control signals.

These signals and converted by the RIO I/O board and transmitted to the Qube Micro over a CAN Bus system.

This reduces the amount of Trailing cables required.

QUBE MICRO

Power Supply - Voltages & Fuses/Circuit Breakers

- A DC UPS is utilised for the QMB motherboard and signal supply ensuring that power is maintained to the main motherboard and the positioning system in the event of a power failure.
- Input voltage - 85Vac - 250Vac Fuse F4
- Output voltage - 24Vdc @ 5A
- Three outputs are provided
  - C24V (only available when mains power present)
  - B24V (available when mains power present and when lost) Orange Disconnect terminal BAT enables B24V
  - L24V (Diode fed common landing supply connected in parallel with each other control panels L24V)
- Safety circuit voltage
  - 110Vac (fed from Hand wind in Normal position switch on door) Fuse F5
  - Note Fuse F5L in series with Safety circuit to enable quick blow if Earth fault on locks.
  - MS Terminal start of Safety circuit. Fuse F5
- Auxiliary Supplies
  - ASL/ASN 230VAC Auxiliary Fuse F3
  - DSL/DSN 230VAC Door Operator Supply Fuse F7

QUBE MICRO

CAN Bus Networks

Terminals CHI & CLO are dedicated to the Shaft Network. The connections to the RIO on top of the Cabin should be made with Trailing cables

That are available with Screened Twisted pairs.

Terminals LHI & LLO are dedicated to the main Landing Network. The connections will be made with the Riser Looms provided during installation.

The CAN Low signal is in White Wire and the CAN High is in Blue these are Twisted 1.5mm2 Cable.

This network is used for Landing feature devices and also Lift to lift communication.

Terminals HHI & HLO are dedicated to the Landing Indicators. The connections will be made with the Riser Looms provided during installation.

The CAN Low signal is in White Wire and the CAN High is in Blue these are Twisted 1.5mm2 Cable.

This network is ONLY used when a separate Riser is used for the Indicators only and Re-directs the display information only.

Parameter “Feature Network” requires to be set to ON

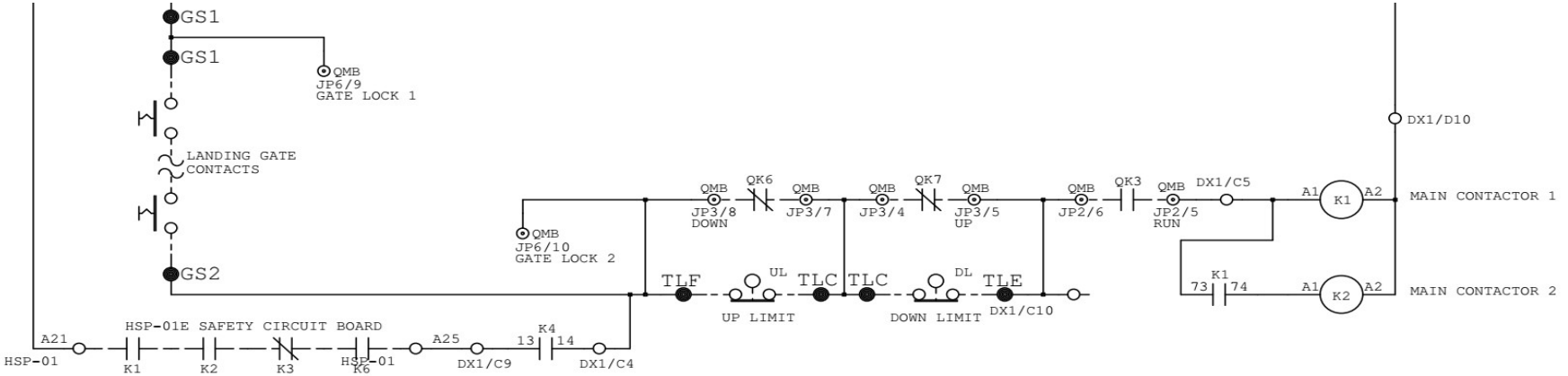
QUBE MICRO

HSP-01E Safety Card

The HSP-01 Safety Card is approved to Bridge the Lock circuit to enable Opening of the Doors during Levelling.

This device is located below the Main controller board in an Orange housing, it Reads shaft information such as Door zone signals, Position system information and is enable from the Main control board if it also confirms the signals are correct together with an allowed speed and “PRE-OPENING parameter set.

The board will only then energise an on board relay that is used in series with other relays to allow a bridging of the Lock circuit so that Power is maintained to the Main contactors.



QUBE MICRO Understanding Event logger

The Qube Micro has a large number of specific event messages, designed to give concise information about the operating history of the control system.
The event messages provide information about the operating mode of the lift controller (e.g. Fire Control, Special Service etc..) and fault finding information in the event of a fault or failure.
The event logger stores up to 100 events and when the event logger is full, a new event is stored and the oldest event drops out of the log.

To access the "System Events" screen, press ↓ or ↑ from the "Main Menu" screen, until the following screen appears.

```
******************
      System
      Events
******************
```

Press E to enter the system event menu and use ↓ or ↑ to view the system event options.

Accessing Event Logger

```
*  System Events  *
**   View Log    **
** Total Events  **
**      :100     **
```

```
PROCESSOR RESET
No.015 Occur:001
02/07/03 Pos: 07
15:47:42 Adv: 07
```

Event Screen Detail
EVENT TEXT
No. – position of event in log
Occur - number of occurrences of a given event since the log was last cleared.
Date - dd/mm/yy
Pos – actual position when event occurred
Time - hh:mm:ss
Adv - advance position when event occurred

Pressing E whilst a given event is displayed will show a line of help text that scrolls across the bottom of the screen.
Pressing E again will show the status of the QMB inputs/outputs at the instant of the event.

Motherboard
Inputs Present
when Event occurred

Inputs 1 – 24
Read from Right to left

i11000101	Inputs 1 to 8
i01101101	Inputs 9 to 16
i10000000	Inputs 17 to 24

The above display has recorded that the following inputs where present when the Event occurred
Row 1 = IP1,IP3,IP7,IP8
Row 2 = IP9,IP11,IP12,IP14,IP15
Row 3 = IP24
See Manual for full Event list.

QUBE POWER

Main Power Main Connections

Terminals L1,L2,L3 N Fused in panel with F1 415VAC Supply (N Neutral not required but terminal provided)

Sequence Must be maintained for Correct operation of Phase Monitoring Relay PFRR.

Terminal U,V,W Hoist motor connections from Main contactors.

If motor runs in wrong direction swap any two Connections to reverse.

Terminals BK+ & BK- are Brake Coil supply connections from BEM Brake Excitation Module via K3 and fuse F2

This device is similar to a Bridge Rectifier but Initially Excites the Brake coil with a Full wave DC voltage then after 1 second it

Half wave rectifies the output reducing the voltage. This enables fast Lifting of the brake, low stress on the coil during running and a faster brake drop.

Always ensure the Varistor is connected.

QUBE POWER

Unidrive SP

The main component in the Qube Power section is the Control Techniques Unidrive SP unit.

This provides the speed control for the Hoist motor.

This device appears on Page 1 of the System diagrams.

The drive determines when the Brake should be lifted when it receives an Enable signal from the Main Control Board.

The Enable signal is derived from both K1 and K2 Contactors being energised successfully.

If the drive can Magnetise the motor, it will control K3 and lift the brake, the control board will apply a speed reference signal and direction and the Motor will rotate.

The output of the Drive has the Contacts of 2 Contactors in series with the Motor connections to comply with EN standards.

The Motor cable MUST be screened and the screen connected to Earth using the Chassis screen clamp and to the Motor Terminal box.

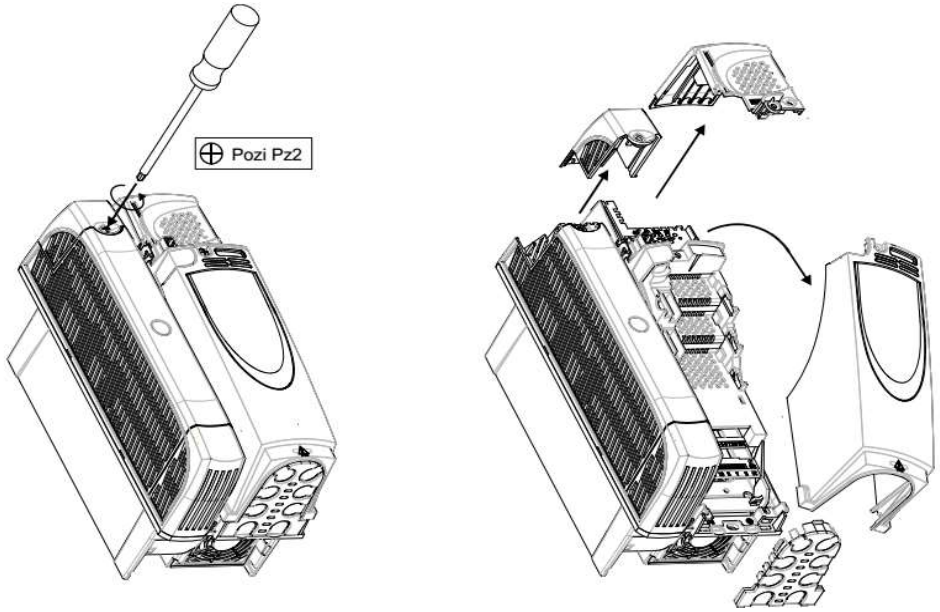
The drive when in Closed Loop mode has a motor encoder connection, this allows the drive to monitor exactly the performance of the motor and can adjust its output accordingly.

In the case of Servo Machines (Permanent Magnet Motors) The encoder uses a Communication protocol Known as Endat 2.1

This is a serial communication that provides a Sinusoidal Feedback together with a absolute count that include the motor Pole position for Phase angle measurement.

QUBE POWER

Unidrive SP Access



If a drive has to be replaced then use the Smart card to clone the Parameters so they can be copied to the new drive. Also is an Apps module is fitted this must also be transferred to the replacement drive. Instruction are on Smart Card.

SMARTCARD

Parameter Storage and Copying

Pr **0.30 = rEAD +**

Drive reads all parameters from the SMARTCARD

Pr **0.30 = Prog +**

Programs all drive parameters to the SMARTCARD

Pr **0.30 = AutO +**

Drive automatically writes to the SMARTCARD when a parameter save is performed

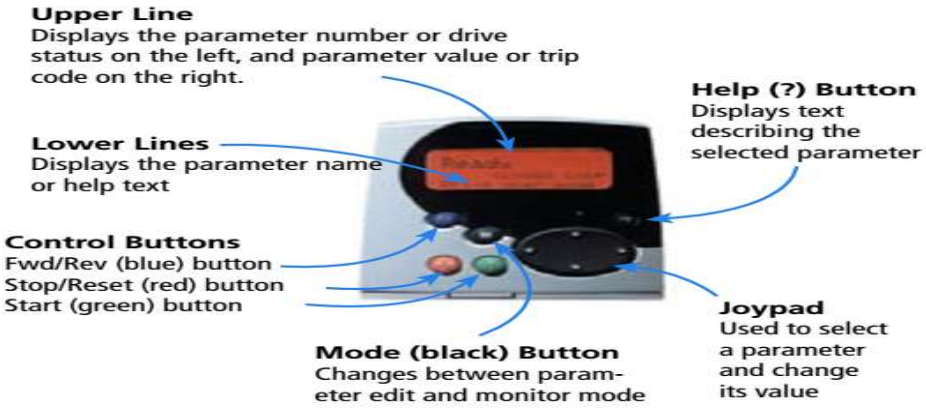
Pr **0.30 = boot +**

Drive boots from the SMARTCARD on power up and automtically writes to the SMARTCARD when a parameter save is performed

QUBE POWER

KEYPAD & DISPLAY

By default, the keypad display is in 'Status Mode' for viewing current drive conditions, and can be changed to 'Parameter Mode' for viewing and editing drive configuration settings.



Status Mode

When in Status Mode, the drive Status Message / Alarm / Trip Code is displayed in the left hand side of the Upper Line, i.e., 'rdy', 'inh', 'OVLd', 'trip'. See the 'Display Messages' topic for more details.

Parameter Mode

When in Parameter Mode, drive functionality can be viewed or modified by using the Keypad. On the upper line of the display, the Parameter Number is shown on the left hand side (ex. 0.10) and the parameter value on the right hand side. The lower two lines display the parameter name, and can display 'Help' text.

Viewing Parameters

Press the Mode (black) button to change the display from 'Status Mode" to 'Parameter Mode.' The cursor will appear at the parameter number.

The parameter number format is MM.PP, where MM = Menu Number (menus are groupings of common functionalities), and PP = Parameter Number (parameters are specific drive functions). For example: Pr. 0.10 is Menu 0 and Parameter 10, which is the estimated motor speed in RPM. Note: Menu 0 contains the most common parameters used in a typical setup.

Navigating Menus and Parameters

You can find any parameter value using the Joypad.

The ► or ◄ buttons on the Joypad are used to navigate between the menus. The ▲ or ▼ buttons on the Joypad are used to navigate between the parameters in a menu.

To Edit/Modify Parameters

In order to change the value of a parameter, go to the parameter you would like to change and then press the Mode button. Now the cursor shifts to the parameter value. You can increase the parameter value by pressing the Joypad ▲ button or decrease the parameter value by pressing the Joypad ▼ button.

Pressing the Mode button again will set the newly selected parameter value, and the cursor will return to the parameter number. Note: Certain parameters are Read Only (RO) and cannot be changed. For example Pr. 0.11— drive output frequency, cannot be changed.

Pressing the Mode button again will return the keypad to Status Mode. Note: If left untouched in Parameter Mode, eventually the Keypad will automatically return to Status Mode upon timing out. Timeout duration is adjusted by Pr. 11.41.

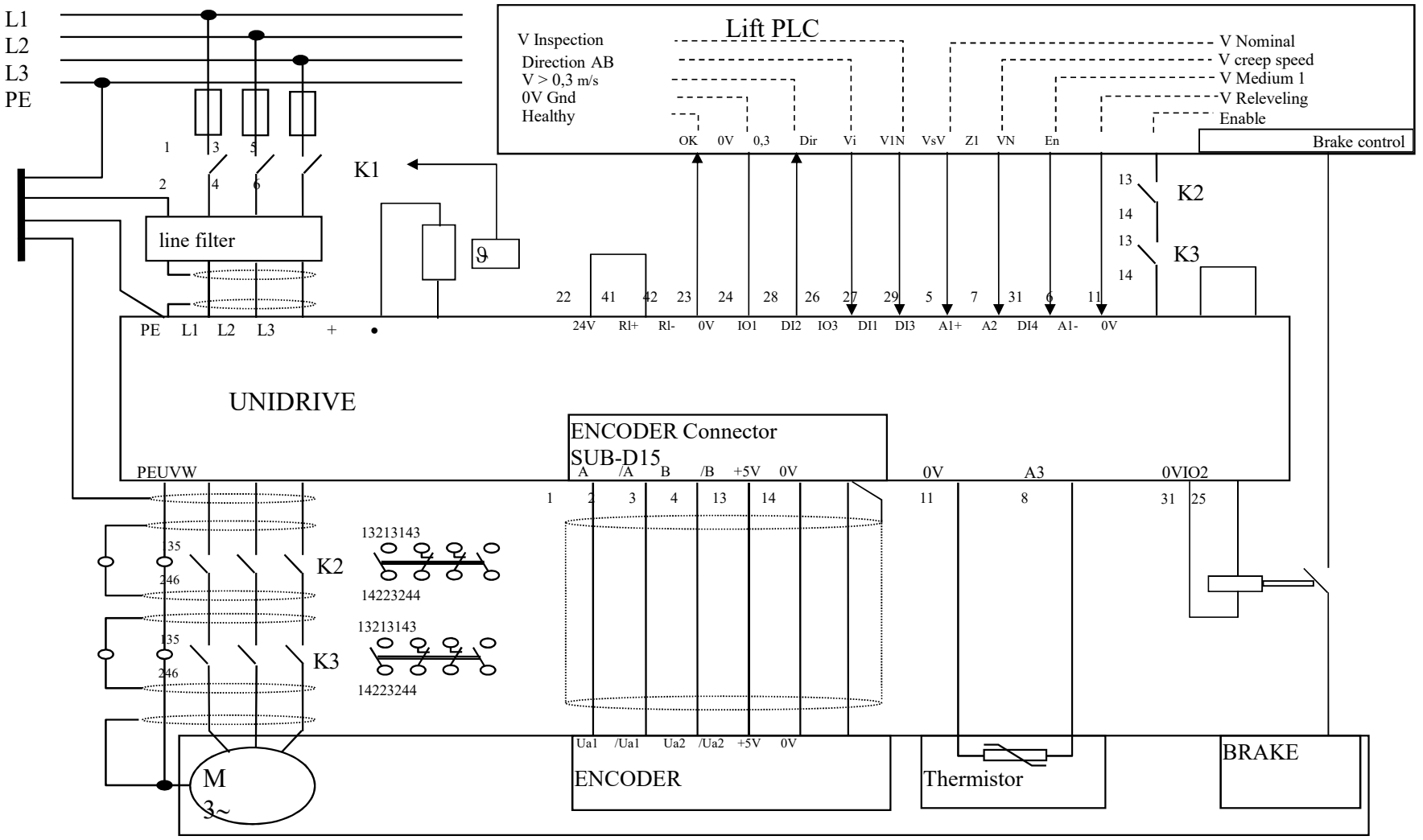
To Save parameter values

Changes made to parameter settings will be lost when the drive is turned off, unless saved. To save new settings, enter 1000 into Pr.0.00 and then press the Stop/Reset (red) button.

To Display On-line Help

When in Parameter Mode, the lower two lines display the parameter name. Help on the selected parameter can be viewed by pressing the Help (?) button. Multi-line text is then displayed on these two lines, which can be scrolled by the ▲ or ▼ buttons on the Joypad. Pressing the Help button again will take the display back to Parameter Mode.

QUBE POWER Unidrive Connections



QUBE POWER Unidrive Trip Diagnostics

- Note: Good Practice to record Phase Angle #3.25 Value and write on Machine next to encoder as this has to be calculated with the ropes off if drive replace and not known.
- Trip generated to protect the drive and the mechanics against damage
- Trip displayed on the drive Display
- Display of the last 2 Trips in **#10.20** and **#10.21**

Trip	Type	Cause	Corrective Action
trip 70	Speed Error	• Encoder • Motor connect • Parameter set	Check Motor and Encoder connection, parameter setting and alignment angle, Check in trip state check rotation direction if opposite sign then swap 2 motor cables Check Brake lifting Check Current output
trip 71	Following Error	• Encoder • Motor connect • Parameter set	Can have same causes above - See Trip 70. Check above 19.01 & 19.02

QUBE POWER Unidrive Trip Diagnostics

SLX.tO	SM X trip: SM watchdog timeout	Coprocessor defective	Only produced if **#17.18 = 1** and SM Application Lite Trips Disable with **#17.18 = 0** + Save + Reset SM Apps
O.Ld1	Overload +24V Supply or Digital Output	Shortage or Overload Digital Output, Relay with high inrush current	Generated if sum current of +24V and Digital Outputs > 250 mA for 10 µs ! Check for external supply connected to +24V- T. 22 Check inrush current of relays connected Check damping circuits of free wheel diodes of relays
Enc1	encoder supply overload	Encoder cable or connector shortages	Maximum current = 200mA @ 15V, or 300mA @ 8V and 5V Check encoder power supply wiring and encoder current requirement - Check encoder cable Use of ready made cables to recommend
Enc2	Encoder wire break	Cable connection failed Cable break	Check cable continuity - Check wiring of feedback signals is correct - Check encoder power is set correctly - Replace feedback device If wire break detection on the main drive encoder input is not required, set Pr **3.40** = 0 (disable Enc2)

QUBE POWER Unidrive Trip Diagnostics

Enc3	Drive encoder trip: phase offset incorrect whilst running	Phasing offset wrong Noise encoder signal Encoder wiring wrong	Check the encoder signal for noise Check encoder shielding and wiring. Check the integrity of the encoder mechanical mounting, Repeat the offset measurement test Disable if no commutation signal used (#3.40 = 1) Check signals separate
Enc4	Drive encoder trip: Communication Error	No serial communication Baud rate wrong Wiring wrong	Ensure encoder power supply is correct Ensure baud rate is correct Check encoder wiring Replace feedback device
It.AC	Output current overload timed out (I^2t) - accumulator value can be seen in Pr 4.19	Motor Overload Encoder Signal disturbance Motor pole count or Encoder lines wrong	Check load locked – Brake open ? Check the load on the motor – lift counterweight Check feedback device signal for noise Check the feedback device mechanical coupling CI.Vector: Tune the rated speed #05.08 Servo: Check thermal time constant **#0.45**. Servo: Check phasing offset .

QUBE POWER Unidrive Trip Diagnostics

OI.AC	Instantaneous output over current: peak output current >225%	Auto-tune voltage Motor insulation Encoder signal Output interruption Current loop tuning Servo offset wrong	If during auto-tune reduce voltage boost Pr **5.15** Check for output short circuit and motor insulation If #05.02 > 100 check motor contactor aux. contact Check encoder mech. coupling, wiring and noise, Reduce current loop gains **4.13** and **4.14** Check offset measurement (servo mode only)
OV	DC bus voltage > peak level or > max. cont. level for more than 30 s	Breaking energy higher than max. poss. dissipation Motor earth fault	Increase deceleration ramp (Pr **0.04**) Decrease braking resistor value Check AC supply level / wave form (notch ringing) Check motor insulation
PH	AC input phase loss or large supply imbalance	Supply imbalance Supply fuse break	Ensure all three phases are present and balanced Check input voltage levels are correct (at full load) Check supply fuses Note: Only caused when power > 50% nominal
UV	DC bus under voltage threshold reached	Supply voltage Fuse break	Check AC supply voltage level Check fusing
OI.br	Braking trans. over-current / short circuit protection for transistor active	Earth fault braking resistor circuit	Check braking resistor wiring Check braking resistor value > minimum value Check braking resistor insulation

QUBE POWER Unidrive SP Useful Parameters

Problem/Symptoms	Param No.	Description	Value
Brake Control Output	18.31	Monitor Brake O/P	OFF/ON
Delay Brake lifting on start	19.25	Brake Delay time	100
Delay Brake drop after zero speed	18.24	Brake Close time	200
Gains/Vibration/ sloppy control	18.25	Speed Loop Kp Gain 2 Travel	3000
	18.26	Speed Loop Ki Gain 2 Travel	2000
	18.27	Speed Loop Kp Gain 1 Start	1000
	18.28	Speed Loop Ki Gain 1 Start	500
Current limiting, Linked to 0.46	4.05		175% >
Current limiting	4.06		175% >
Current limiting	4.07		175% >
As above	0.06	Symetrical Current Limit	175% >
Set to motor data, reduce to increase current limit %	0.46	Rated Current	
	0.03	Accel	
	0.04	Decel	
	4.02	Active Current +Up,-Dn	
	4.17	Magnetising Current	
	5.02	Output Voltage	
Check tacho feedback	19.01	Final speed reference	RPM
Check tacho feedback	19.02	Speed Feedback	RPM
	3.25	Encoder phase angle	0 to 360 Degrees
	3.29	Encoder position	
Transfer Card to drive	PR0.30	Smartcard Default block	rEAD
Transfer Drive to card	PR0.30	Smartcard Default block	Prog
OI.br (Brake Trip)	10.30	Internal Brake	0
It.br (Brake Trip)	10.31	Internal Brake	0.00
	0.40	Autotune	1 Static 2 Rot Gearless 4 Rotational
	0.41	Max Switching Frequency	12
	0.42	Number of poles	Auto
	0.43	Rated Power factor/Cos Phi	0.8
	0.44	Rated Voltage	415
	0.45	Rated Load RPM/Rated Speed	1400
	0.46	Motor Rated Current Amp	14.7
	0.47	Rated Frequency Hz	50
	0.48	Drive mode	Servo
	18.43	Motor Magnetised	OFF/ON
	18.29	Nominal RPM	48
	18.30	Nominal Speed	1000

QUBE RIO

Remote I/O

Located on the Lift Cabin this unit houses the Cartop I/O card and the Speech card.

It has its own Power Supply unit that generates a local CC24V 24vDC supply, this MUST NOT be connected to the C24V supply that is derived from the Qube Micro panel.

The B24V from the Qube micro is brought down to the RIO via trailing cable to provide a permanent supply for the PSE (Position Encoder System)

The C0V is okay to common as all references of zero volts are connected to Earth.

All signals to the I/O are 24VDC and the Shaft network CAN Bus connects in CHI & CLO in this unit via a Trailing cable screened twisted pair.

Cartop Test Control signals for Up, Down and Door Open/Close are fed into this unit, therefore if this unit is faulty the lift cannot be operated via the Cartop Test box so the EMOP pendant in the Qube Micro panel will need to be used. This will still be overridden if the Test switch is on, so the Test switch should be left on Normal

To enable operation with EMOP device.

QUBE PSE

Position System Encoder

The Position System Encoder provides and Absolute Position and

Speed feedback to the Main controller board via the Shaft CAN Bus connections CHI & CLO.

The Encoder is connected to the PSE Interface card this provides the Communication and Slowdown and Stopping calculations

Required for correct operation of the Lift.

The encoder requires a Shaft Learn before the lift can be placed in service.

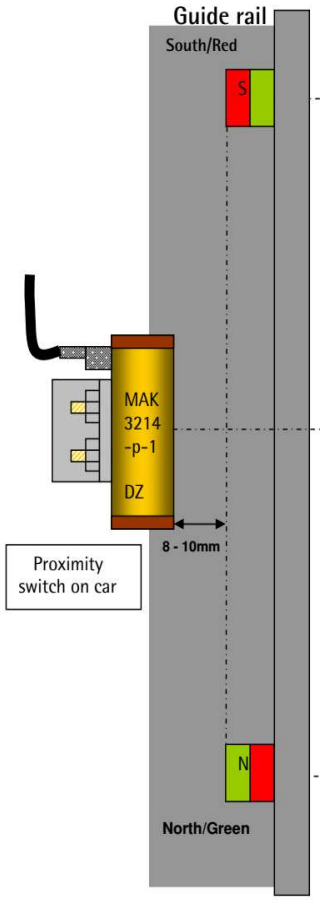
During this phase all Magnet positions are recorded as is the profile of the Drive unit, so the correct Slowdown positions can be calculated.

A Handheld HMI is required to facilitate the Learn phase.

Please refer to PSE Manual for comprehensive operation and Diagnostics.

Overspeed Governor with Encoder Mounting (6mm Shaft Encoder)

QUBE PSE



Position System Magnet Placements

Although the Position System Encoder provides an Absolute position reference it initially requires reference points in the lift shaft.

This is achieved with Magnets in the lift shaft a using 2 x Bi-Stable switches.

During the Automated learn operation the lift moves through the shaft and each Magnet position is stored.

It requires a Door Zone at each floor by the means of 2 x Magnets with opposite poles placed at a distance of approx. 300mm between centers. (150mm either side of floor level)

And a Reset Magnet placed in the center of the shaft but not overlapping a Door Zone area.

The single magnet is associated with a Parameter “Reset Floor” and this identifies the zone to start counting the Door Zone magnets when lost and during a learn.

As the Switches are Bi-Stable only 1 x Magnet is required and as can be seen from the diagrams the reset Switch is triggered and remains ON as the Lift passes the Magnet when travelling Up and switches OFF and remains Off when travelling down.

Therefore when a correction run is required only half of the shaft travel at most is necessary and the Controller determines which direction to correct based on the Reset switch state.

On = Top half of shaft so travel down.

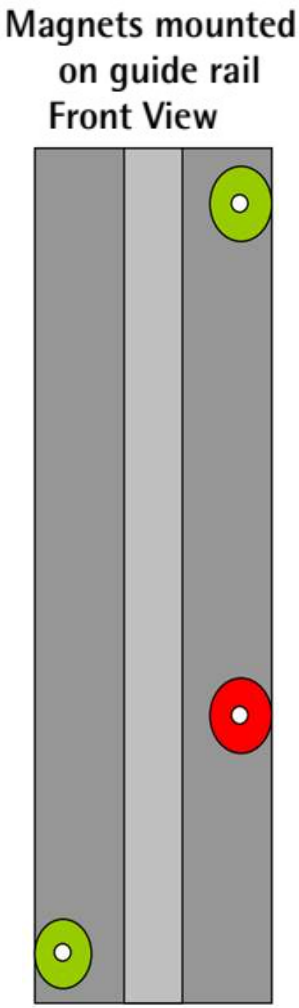
Off = Bottom half of shaft so travel Up.

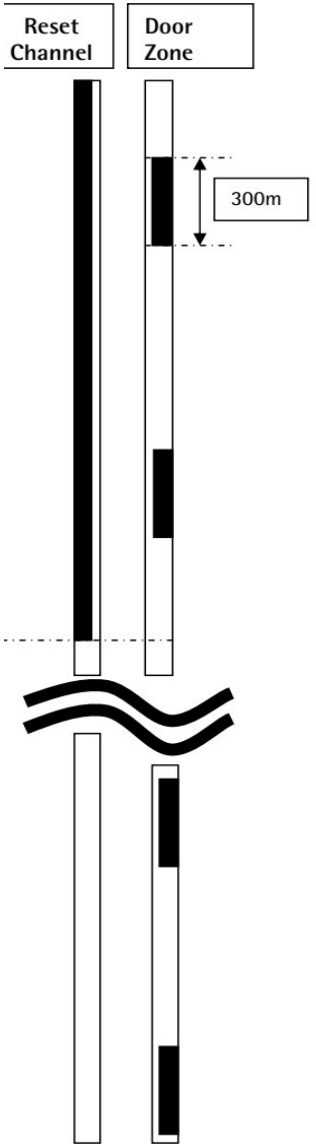
Also note the mounting distance of the switch is important as this can cause false triggering.

Worn guide shoes can affect this causing tilt.

The Encoder will give out an error message related to this

“Magnet Error”





QUBE PSE

Position System Initial Setup

The Position System Encoder provides an Absolute Position accurate to 1mm.

It converts its incremental count to an absolute value based on a “Resolution” Parameter that equates to its mounting method.

This value Tells the Encoder interface how many pulses it will receive per 1cm of travel and the various Resolutions are available in the Manual.

It also requires basic information such as Lift speed and Number of floors and its Reset Floor Magnet position to be set before a learn.

Failure to do this correctly will likely cause an overtravel during the learn.

All this information is in the Manual.

Table 6.1 Resolution/cm for 500ppr encoder

Encoder Mounting	Pulses/cm
Type 14A Toothed-belt pulley	11
Type 15A Cord pulley	32
LK200 Governor	32
LK250 Governor	25
LK300 Governor	21
LK350 Governor	18

Tip
Set the Resolution/cm parameter before the speed parameters

Table 6.2 Examples of Speed parameter values assuming standard 3 Meter floor heights

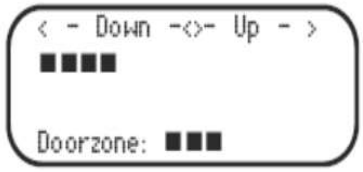
Contract speed	vnom (v3)	v red. (v2)	v red. (v1)	v adv.door	v re-level	v Test (vl) Only for High speed test op
0.75 M/s	750	750	750	300	100	620 Default
1.0 M/s	1000	1000	1000	300	100	620 Default
1.5 M/s	1500	1500	1000	300	100	620 Default
2.0 M/s	2000	1500	1000	300	100	620 Default
2.5 M/s	2500	1500	1000	300	100	620 Default
3.0 M/s	3000	1630	1000	300	100	620 Default
4.0 M/s	4000	2500	1000	300	100	620 Default

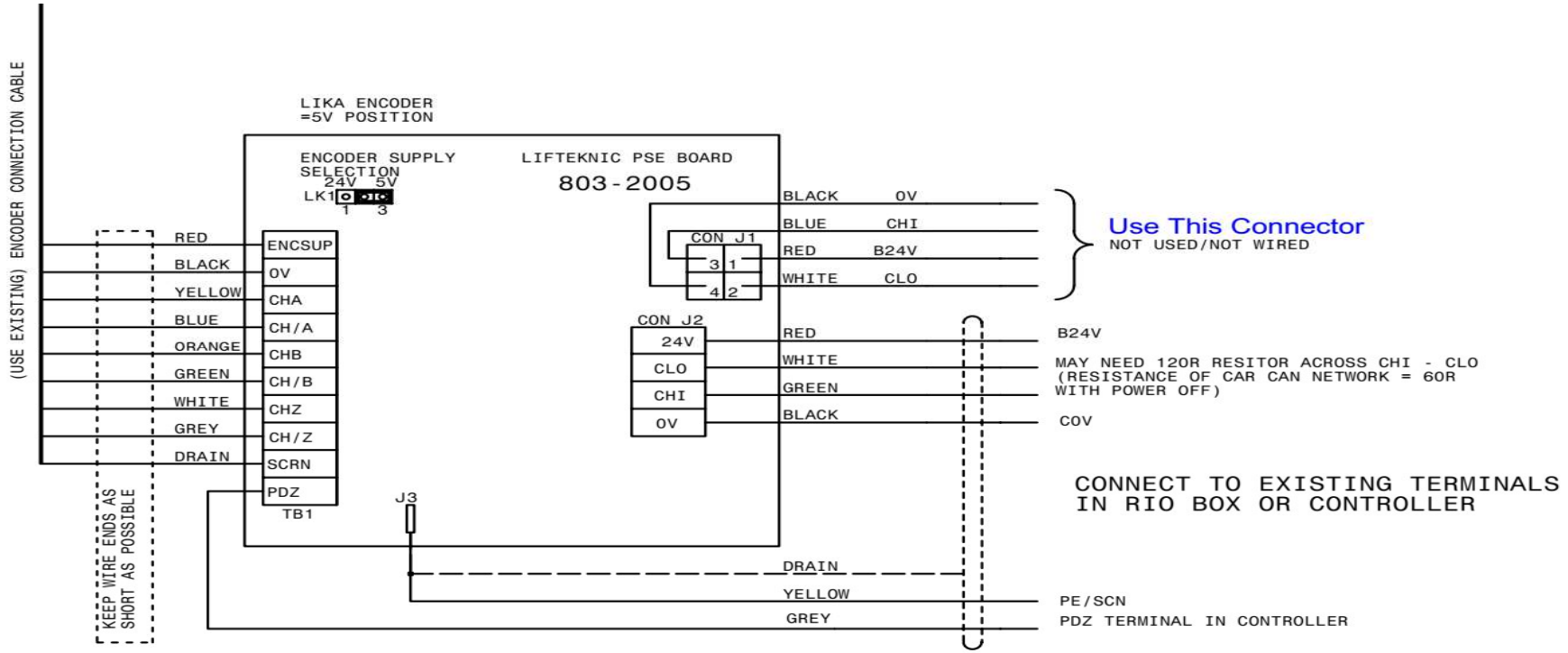
Reset Floor Value

Top level	Place magnet between levels	Parameter Value
32	16 AND 17	16
31	15 AND 16	15
30	15 AND 16	15
29	14 AND 15	14
28	14 AND 15	14
27	13 AND 14	13
26	13 AND 14	13
25	12 AND 13	12
24	12 AND 13	12
23	11 AND 12	11
22	11 AND 12	11
21	10 AND 11	10
20	10 AND 11	10
19	9 AND 10	9
18	9 AND 10	9
17	8 AND 9	8
16	8 AND 9	8
15	7 AND 8	7
14	7 AND 8	7
13	6 AND 7	6
12	6 AND 7	6
11	5 AND 6	5
10	5 AND 6	5
9	4 AND 5	4
8	4 AND 5	4
7	3 AND 4	3
6	3 AND 4	3
5	2 AND 3	2
4	2 AND 3	2
3	1 AND 2	1
2	1 AND 2	1
1	N/A	N/A

QUBE PSE Basic Connections

The Latest Encoder uses a separate interface card shown below.
The existing Encoder lead can be re-used if correct Encoder fitted .
The card is the connected to the Terminal rail either in the RIO or Controller depending on location of the encoder. Also make sure the PDZ connection is made as this input is used to Read the Magnet positions and can be verified in the Speed Display menu , seen as Doorzone 3 x Squares .





QUBE PSE Basic Parameters

Below are the Parameters Required for a New PSE Installation that MUST to be set with the Handheld HMI (Parameters with Values shown may be left at Default, all others are required) They are Found in Menu “Position Param”-”User Param” If there is another similar lift system then it can be helpful to check the parameters on the other lift.

Parameter	Description	Typical	Units
Top floor	Number of levels (Number of openings)	--	Integer Tens/Units
Bottom floor	Lowest level served	1	Integer Tens/Units
v nom (v3)	Highest speed possible (contract speed) See Table 6.2	----	mm/Sec
v red (v2)	Reduced speed 2 <= v3 See Table 6.2	----	mm/Sec
v red (v1)	Reduced speed 1 <= v2 See Table 6.2	----	mm/Sec
v adv.door	Speed allowed to pre open doors EN81 Default 800	300	mm/Sec
v re-level	Speed at which to re-level	100	mm/Sec
v Test1	Test Highest speed (if two test speeds) Use Default 620	620	Note: Shaded param’s are usually left at their default values mm/Sec
Resolution/cm	Number of pulses from encoder per 10mm/1cm travel of car. See Table 6.1 (Set this parameter first)	--	Pulses/cm
Reset floor	Level of the Position encoder reset switch (Usually mid shaft) See table 6.5 (Floor below reset magnet)	--	Integer Tens/Units
Doorzone	Distance between Magnets at floor in mm Use Default 300	300	mm
Levelzone	Distance of car movement to initiate re-level EN81 Use Default 40	40	mm

QUBE PSE Learn Operation

The system is now ready to perform a complete setup Learn process, you should have checked all Magnets are operating correctly and confirmed the Reset Floor position value.

Place ON EMOP and OFF Cartop test.

This setup process is an automated procedure that may take up to 15 minutes.

The lift car and landing doors should be functional but disabled.

e.g. ***Engineers Tools – Door Disable = ON***

If the control system has Direct to Floor this should be disabled.

e.g. ***Engineers Tools – Disable Direct to Floor – DTF Disable = ON***

The setup operation is performed external to the hoist way with the Lift on Normal there should be NO persons in the shaft or on the lift car top !!!!!!!!!

The Position System is now ready to learn the magnet positions and calculate the slowing and stopping distances.

To start the Automated setup process :-

1. Using Handheld MMI.
   Set-up shaft – Complete Setup
2. Immediately turn the controller from EMOP to Automatic (Normal).
   The controller should display:-
   Status : ! Setup This means the system is Not yet setup and will switch to Terminal Mode.
   The setup will automatically start, during the process the Handheld MMI will display in turn the part of the setup it is performing. If you wish to stop the Setup, press any key and when prompted press YES.

QUBE PSE Learn Operation

It is highly likely after after a learn Operation there will be a requirement to adjust the floor levels. This is due to inaccurate placement of the Magnet positions as the Encoder assumes absolute floor level to be 150mm in from either Door Zone.

This again is an Automated process that takes the lift to each floor in Both directions and allows the User to adjust the position to 1mm of accuracy.

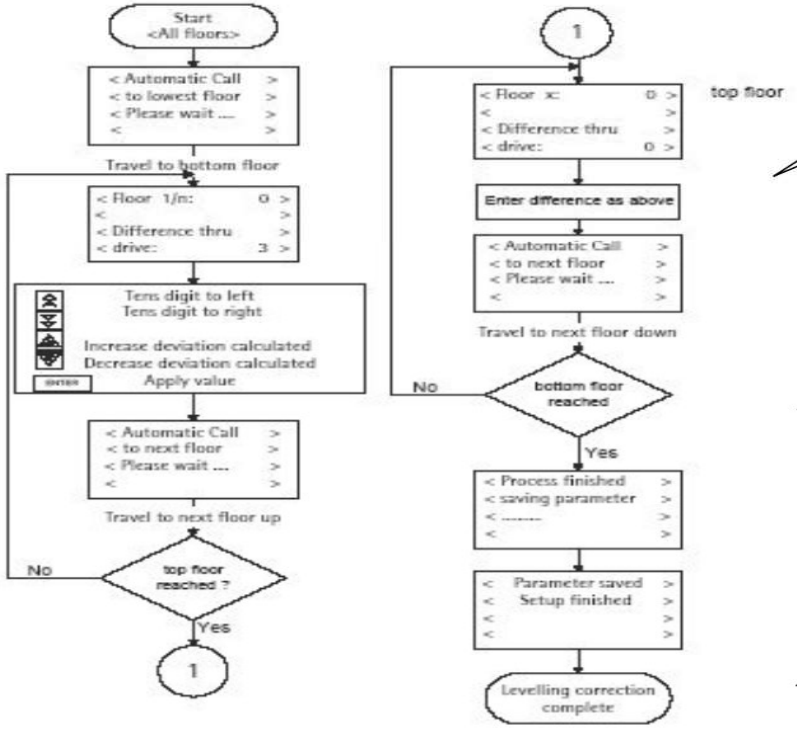
This process is best performed in the Lift Car with the Handheld HMI.

This Car sill should be measured against the Landing sill and a Positive(if car High) Or Negative (if car low) value set.

This is performed on Normal so the ENGINEERS TOOLS- DOOR DISABLE = OFF And PREPARE TO TEST = ON to prevent Landing Calls.

The setup process assumes that floor level is at the center of the door zone magnets that correspond to the floor the lift is stopping at.
If the lift car sill is not level with the landing sill because of the inaccurate placement of the magnets the difference may be adjusted to overcome this error.
This is achieved with the menu ***Correct level - All floors***
This provides an automated process for sending the lift car to each floor in turn in both directions, and allows the user to measure the difference and enter this measurement in mm to compensate for the levelling error.
For convenience this process may be performed in the lift car, the Handheld MMI should be plugged into the COP position indicator connection or to the additional loom provided.
The lift follows the sequence below.

Chart 8.0 Correcting levels



TIP
Hold door open until correction value has been entered if done from inside car.

TIP
See **10. User forms Correct level record** at end of maual to record the floor data.

Now see Section 4.0
Proximity Switches and magnets fig 4.3 and fig 4.4

Note: Tell the encoder how high or low the car is in millimeters by :-
If the **car sill is above the landing sill** the deviation **value is positive** (use up key). e.g. 15
If the **car sill is below the landing sill** the deviation **value is negative** (use dn key) e.g. -15

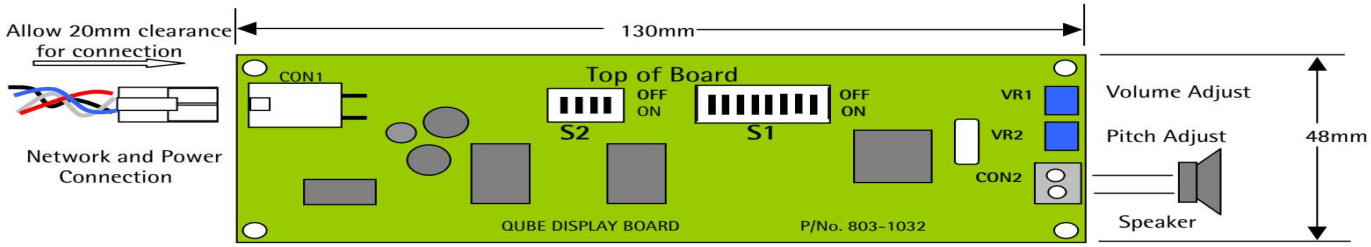
QUBE Landing Indicators

The Qube Control System is a CAN Bus Network based system.
Not only is the Shaft/Cabin data networked but also the Interlift Communication and the Landing fixtures.
The two main devices are the Position Indicator and the Landing Call Node.
The Indicator requires that it is configured so that it knows what lift and what level it is to display information for. This is done by the means of 2 DIL(DIP) switches.

The 8 way sets the Floor Number in Binary, so that it can Identify the correct Hall Lantern/Gong message and a 4 way switch that sets its corresponding Car Number.
This switch value is in Binary but 1 must be added to derive the correct Car number.
e.g.
All off = 0 = Car 1
Switch Position 1 On = 1 = Car 2
Switch Position 1 & 2 On = 3 = Car 4

See Tables Next Page

QUBE Landing Indicator



S1 – Switch module 1 (Floor Level and Features)

Switch 1, 2, 3, 4, 5, 6 – are used to set the floor level in binary format (see table S1 below for binary format).

Switch 7 – is the in Car switch, this switch should be set when the indicators is used in the lift car, also set the level number to the highest level plus one.

Switch 8 – is used to change the orientation of the display by 90 degree's when a narrow footprint is required this can also be changed Via the controller – Parameter :– System Configuration/Contract/VERT HALL/CAR IND = ON (Mount with CON1 to bottom).

S2 – Switch module 2 (Lift Number and Feature)

Switch 1, 2, 3– These are used to set the Lift number in binary format minus 1 e.g. 0 = Lift 1, 1= Lift 2, 2= Lift 3, 3= Lift 4 (See table S2 below for binary format)

Switch 4 – is used to suppress the lift position character, only the scrolling messages are displayed and the Hall Lantern Arrow when enabled in the controller– Parameter :– System Configuration/Contract/HALL LANTERNS = ON

S1						
Value –	1	2	4	8	16	32
SwitchNo.–	1	2	3	4	5	6
Level No.						
1	1	0	0	0	0	0
2	0	1	0	0	0	0
3	1	1	0	0	0	0
4	0	0	1	0	0	0
5	1	0	1	0	0	0
6	0	1	1	0	0	0
7	1	1	1	0	0	0
8	0	0	0	1	0	0
9	1	0	0	1	0	0
10	0	1	0	1	0	0
11	1	1	0	1	0	0
12	0	0	1	1	0	0
13	1	0	1	1	0	0
14	0	1	1	1	0	0
15	1	1	1	1	0	0
16	0	0	0	0	1	0
17	1	0	0	0	1	0
18	0	1	0	0	1	0
19	1	1	0	0	1	0
20	0	0	1	0	1	0

Continued next column

S1						
Value –	1	2	4	8	16	32
SwitchNo.–	1	2	3	4	5	6
Level No.						
21	1	0	1	0	1	0
22	0	1	1	0	1	0
23	1	1	1	0	1	0
24	0	0	0	1	1	0
25	1	0	0	1	1	0
26	0	1	0	1	1	0
27	1	1	0	1	1	0
28	0	0	1	1	1	0
29	1	0	1	1	1	0
30	0	1	1	1	1	0
31	1	1	1	1	1	0
32	0	0	0	0	0	1

S2				
Value –	1	2	4	8
SwitchNo.–	1	2	3	4
Lift No.				
1	0	0	0	0
2	1	0	0	0
3	0	1	0	0

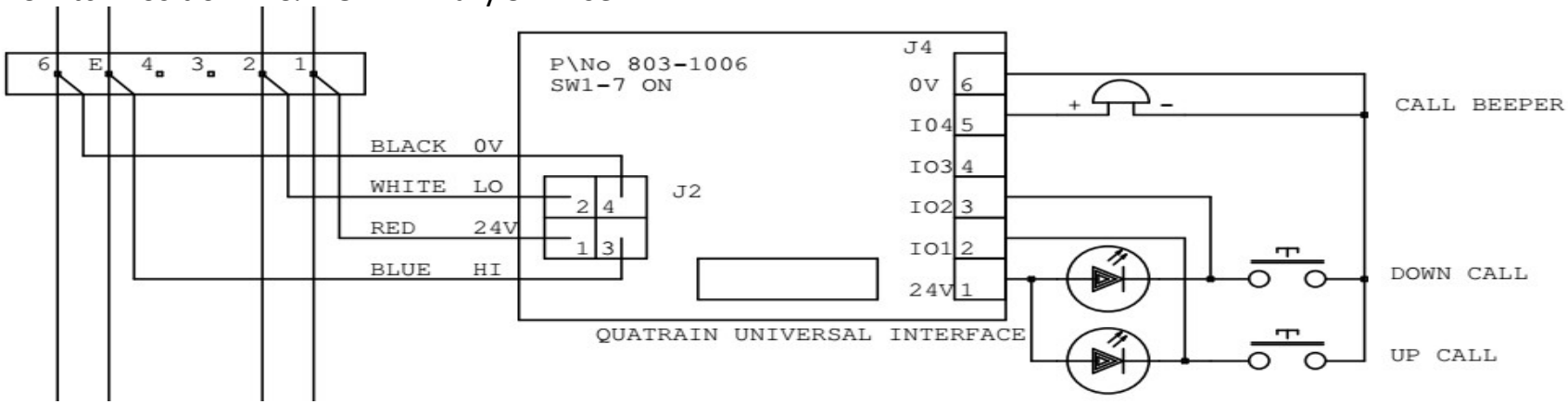
Continued next column

S2				
Value –	1	2	4	8
SwitchNo.–	1	2	3	4
Lift No.				
4	1	1	0	0
5	0	0	1	0
6	1	0	1	0
7	0	1	1	0
8	1	1	1	0

0 = Switch OFF
1 = Switch ON

QUBE Landing Nodes

The Landing Call Node also needs configuring and it uses the same I.D Format as the indicator.
I needs a knows what floor it is positioned so that the controller can Identify the Call level request and turn on the appropriate acceptance Indicator and sound the Acceptance beeper.
This is achieved exactly the same as the Indicator by the of means of the DIL switches.
One exception is Switch No, 7 of the 8 way switch, this needs to be set ON, as the Node has multiple uses and this switch signifies it is Landing Call mode.
The 4 way switch is used to identify the Call riser with the same method as the Indicator and the usual value starts at Riser 4 or above. This way it is highly unlikely the Identifier will clash with an Indicator if placed on the same Network.
e.g.
Switch Position 1 & 2 On = Binary 3 = Riser 4



QUBE CAN BUS UNDERSTANDING

PROPERTIES OF CAN BUS

Some reasons why CAN is suitable for Lifts

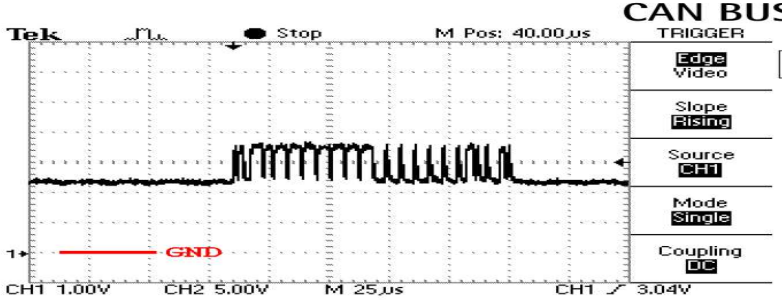
- Messages uses a clever scheme of bit-wise arbitration to control access to the bus, and each message is tagged with a priority
- Multi-master hierarchy, which allows building intelligent and redundant systems. If one network node is defect the network is still able to operate
- Broadcast communication. A sender of information transmits to all devices on the bus. All receiving devices read the message and then decide if it is relevant to them
- Sophisticated error detecting mechanisms and re-transmission of faulty messages
- Differential driven signal
- High noise immunity
- No specialised cable required just twisted pairs
- High speed transmission over long distances

Additional Reasons

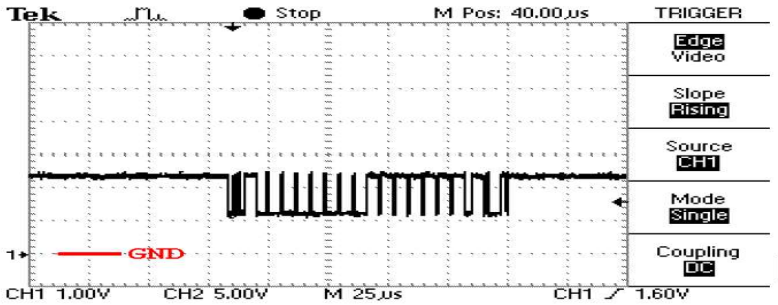
Allows manufacturers to build standard product not Building specific as I/O requirements are external to main controller. E.g same Control panel can be used for 2 Stop lift as 32 stop.

QUBE CAN BUS UNDERSTANDING

CAN BUS OSCILLOSCOPE TRACES

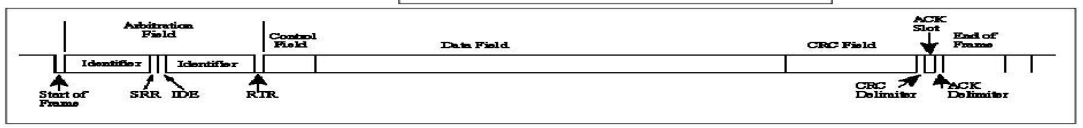


TRACE TAKEN FROM CAN HI TO GROUND



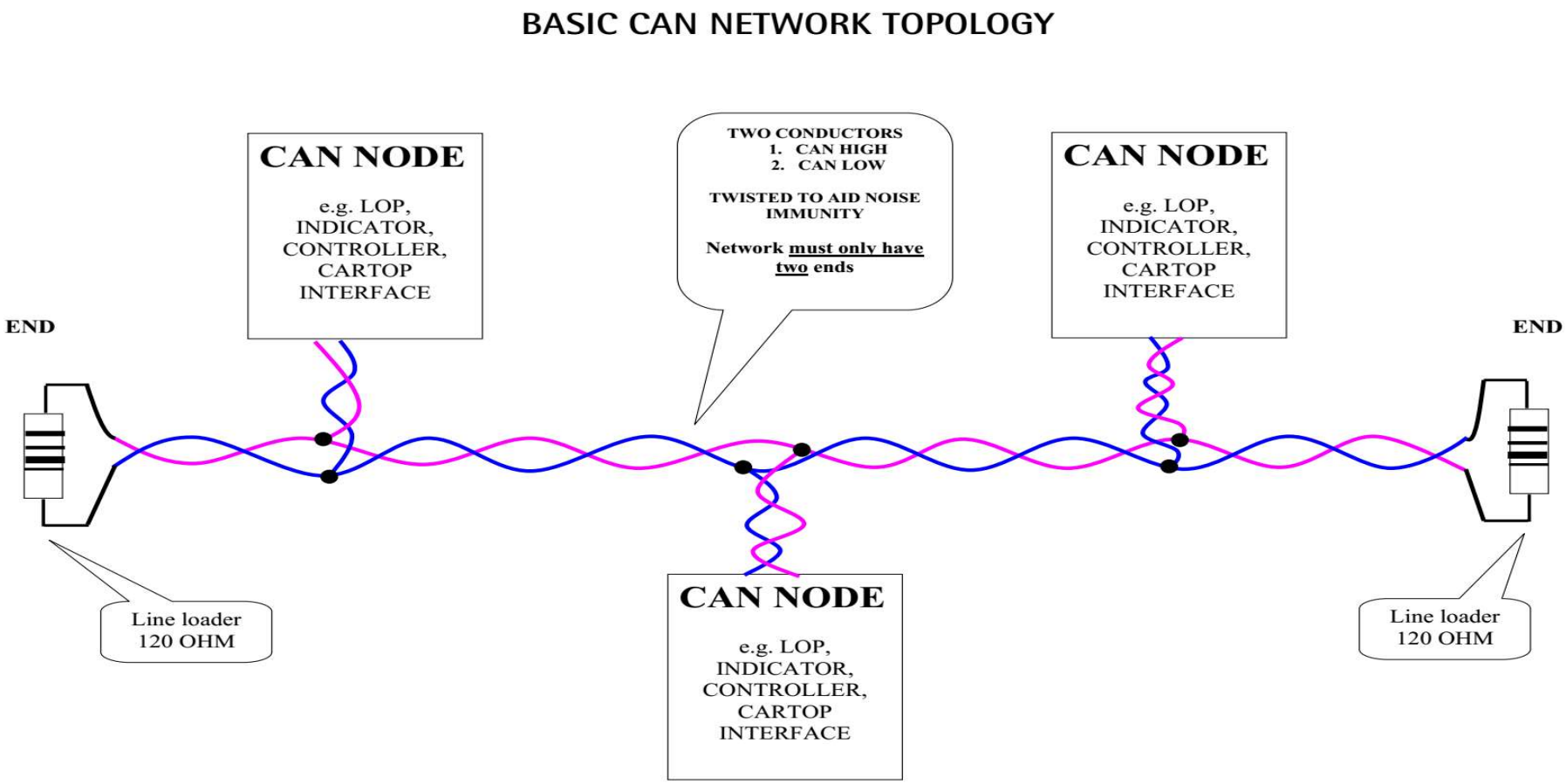
TRACE TAKEN FROM CAN LOW TO GROUND

CAN MESSAGE FRAME – UP TO 94 BITS



CAN Uses a Differential Pair Signal whereby the Date Frame is transmitted on 2 Conductors of Opposite Polarity.
The device that Deal with this system is called a Tranciever and basically adds the signals together.
This is why a twisted pair is used, so that if noise is detected it is transferred to both conductors and the Summation device cancels it out. E.g Positive spike value of +1 added to Negative Spike Value of -1 = Zero

QUBE CAN BUS UNDERSTANDING



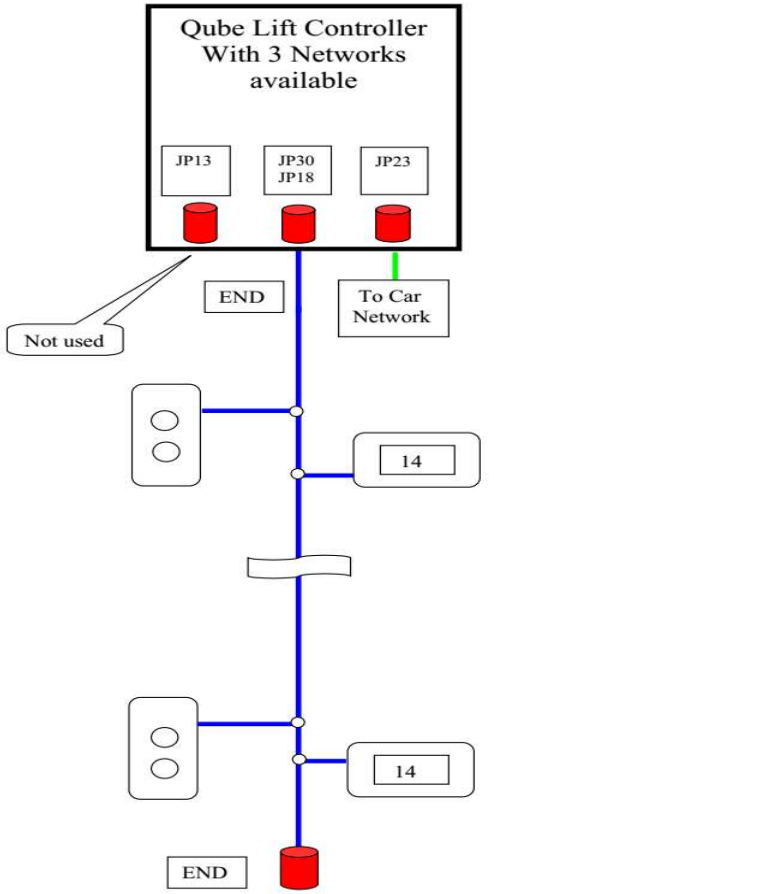
QUBE CAN BUS UNDERSTANDING

Line loader
120 Ohm
resistor

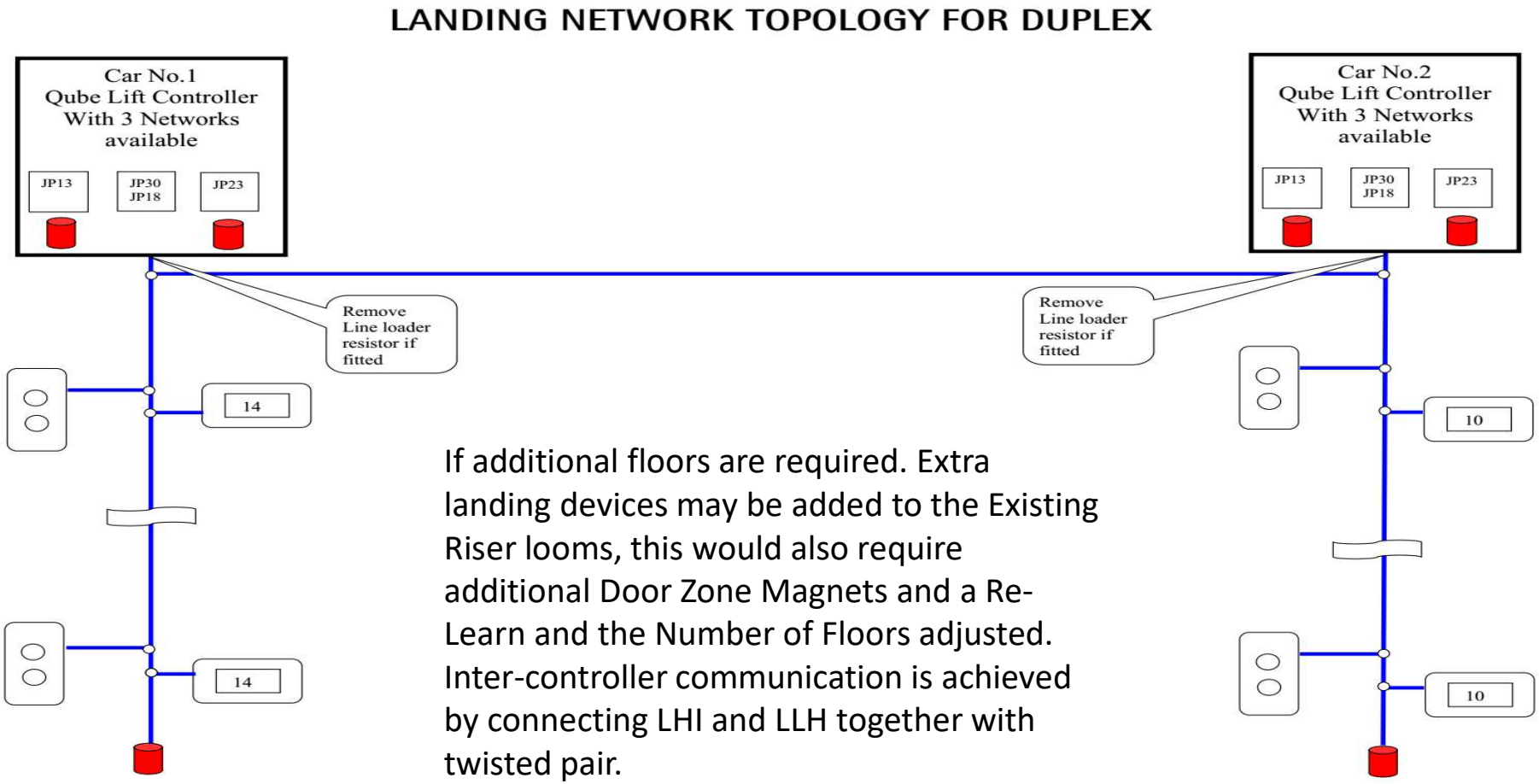
PCB	TERMINALS	USE
JP13	HHI AND HLO	Indicator only when enabled
JP30/JP18	LHI AND LLO	All Landing and Group data
JP23	CHI ANDCLO	Car/Positioning only data

The Optimum Load for a CAN network is 60 Ohms this is achieved by having 2 x 120 Ohm Resistors in Parallel ideally located at both ends on the Network.
This is similar to other standards such as RS485
The recommended maximum devices is 64 Nodes but other factor have to be taken into account such as overall power requirements.

LANDING NETWORK TOPOLOGY FOR SIMPLEX

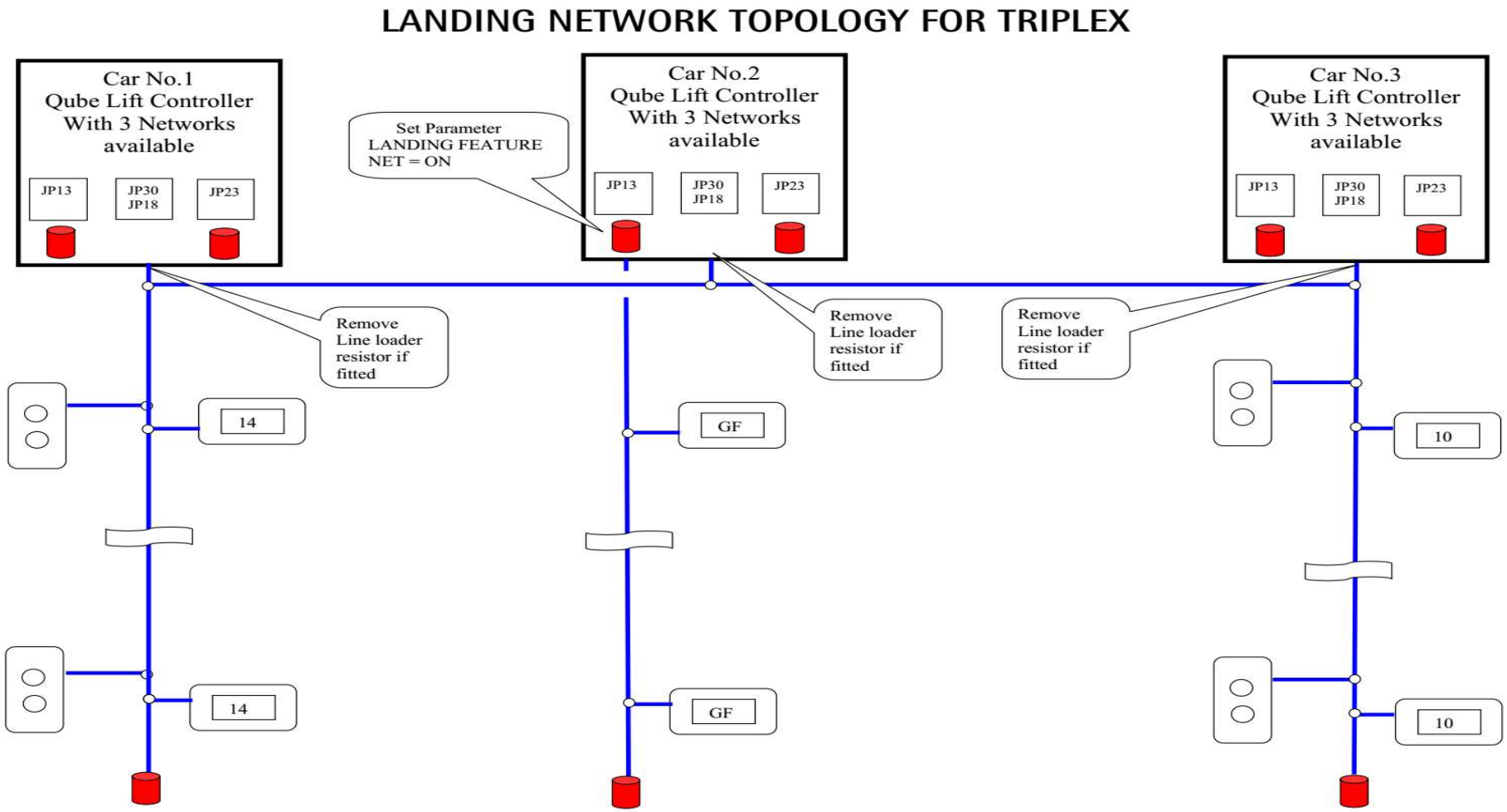


QUBE CAN BUS UNDERSTANDING

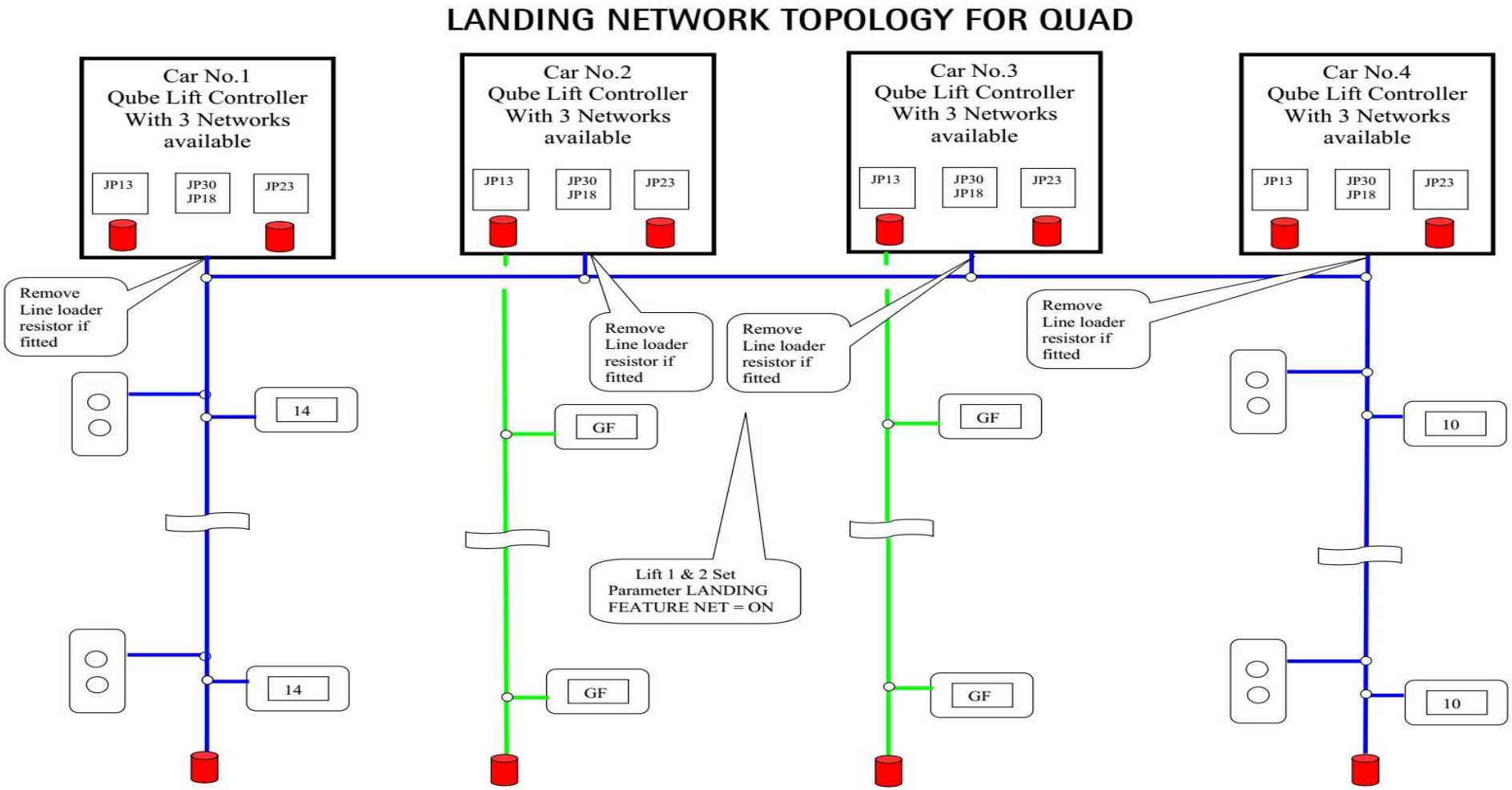


If additional floors are required. Extra landing devices may be added to the Existing Riser looms, this would also require additional Door Zone Magnets and a Re-Learn and the Number of Floors adjusted. Inter-controller communication is achieved by connecting LHI and LLH together with twisted pair.

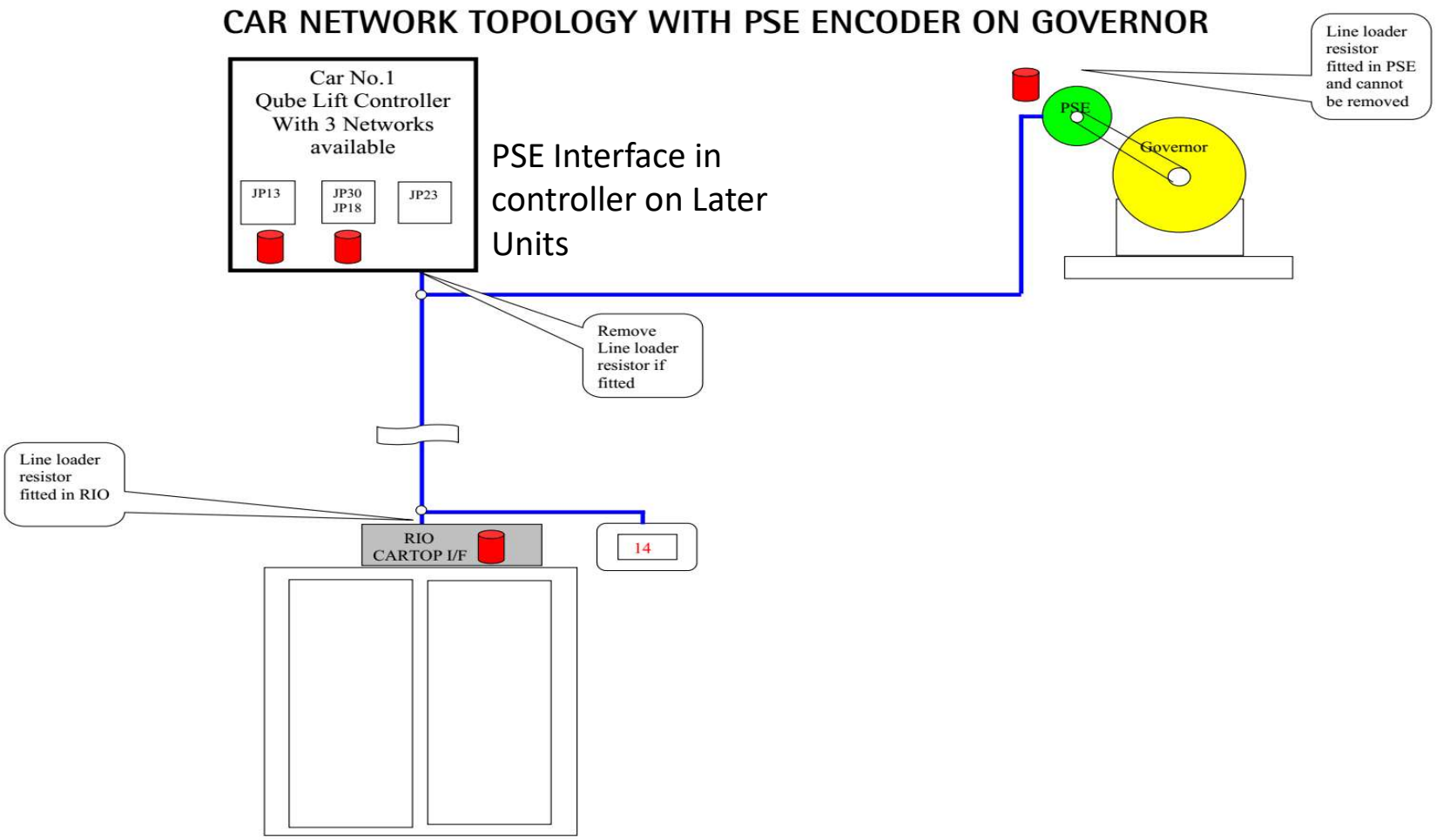
QUBE CAN BUS UNDERSTANDING



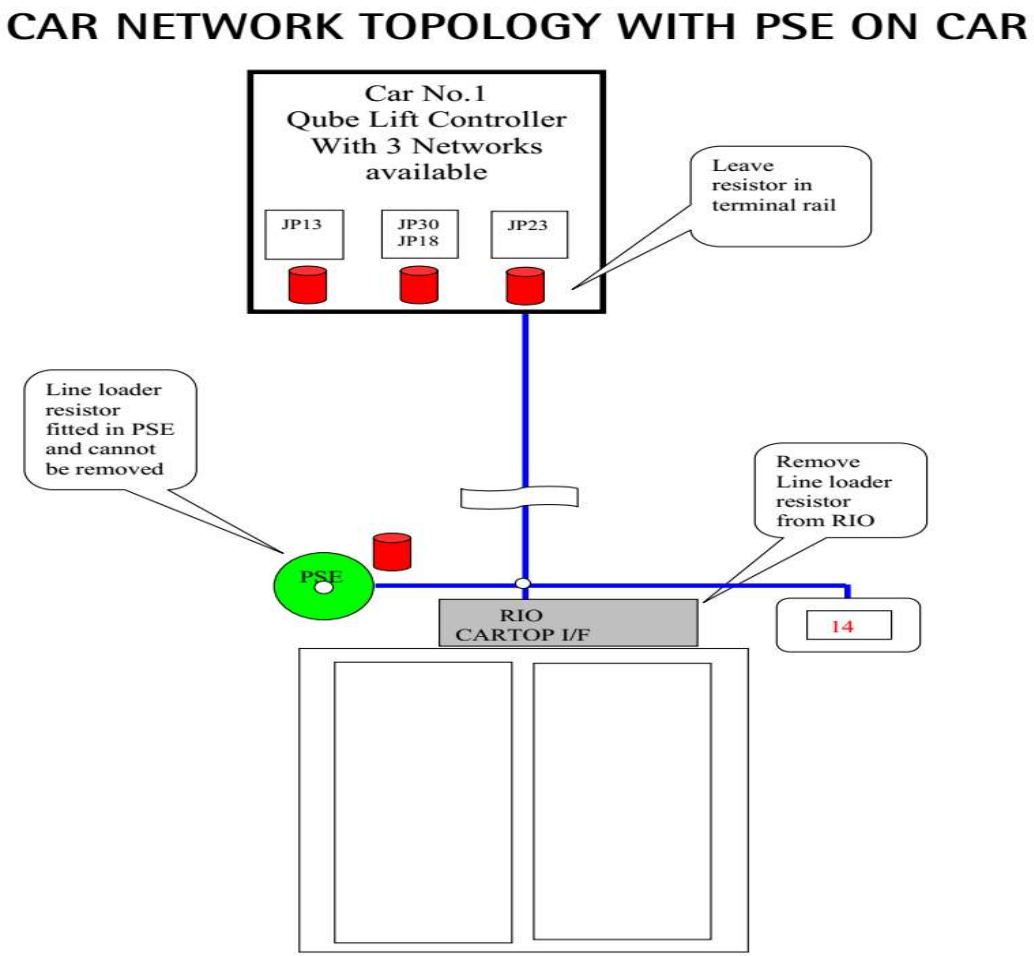
QUBE CAN BUS UNDERSTANDING



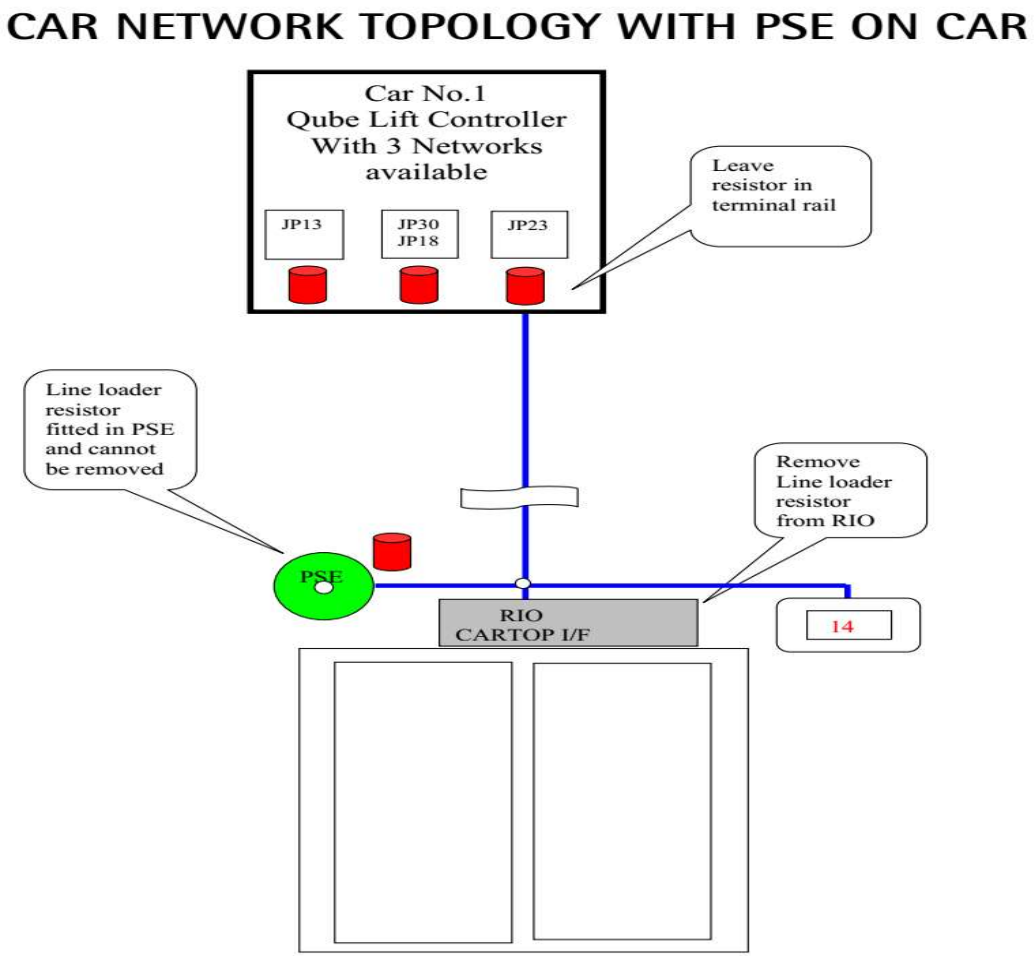
QUBE CAN BUS UNDERSTANDING



QUBE CAN BUS UNDERSTANDING

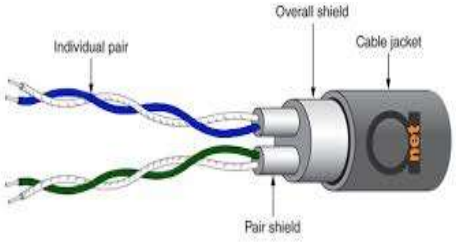


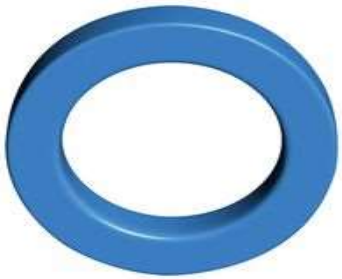
QUBE CAN BUS UNDERSTANDING

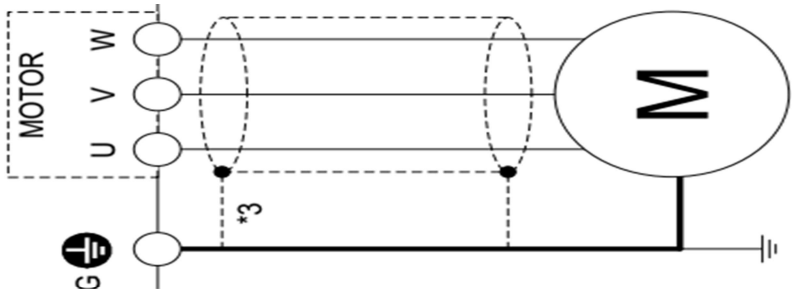


QUBE EMC Brief

Occasionally with Electrical systems that rely heavily on Digital communications intermittent issues can be experienced. This can quite often be due to a High energy spike corrupting a Comms message or causing an error within the low voltage high speed Electronic systems.
Electrical Noise will always be generated especially when High Voltage High current systems with a Inverter Drive are present.
Door Operator Regulators can also cause issues.
These devices do not need to be a issue if correct EMC precautions are taken by the installer.
To prevent issues the Electrical noise needs to be prevented from reaching the vulnerable devices and if any is present it needs to be attenuated and/or removed.
This is the importance of a Good Earth on the system as it is used to shield and remove the Electrical noise under most circumstances.
Ferrite rings can also be used to attenuate Noise especially on the output of the Lift Drive.
All shielded cables should have good Earth connections each end to the Shield and their conductor kept as short as possible.
It is especially important that the Lift motor to drive cable is terminated this way, the Qube controller provide an EMC Clamp for this.







QUBE CONTROLLER

TRAINING NOTES END SLIDE