U.S. SMOKE & FIRE®

INSTALLATION GUIDE

ESC | Elevator Smoke Curtain



ESC Elevator Smoke Curtain

Installation Guide

IMPORTANT INFORMATION - PLEASE READ

Health and Safety Information

Read all of the instructions in this booklet - including all the WARNINGS and CAUTIONS - before using this product. If there is any instruction which you do not understand, DO NOT USE THE PRODUCT.

Safety Signs



WARNING
Indicates a potentially hazardous situation which, if not avoided, could result in death or personal injury.



CAUTION
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to the user or users, or result in damage to the product or property.

Signs and symbols used on equipment and Documentation



Caution, risk of Electric Shock.



Caution, attention to possibility of risk of damage to the product or surroundings. Refer to install manual.



Observe precautions of handling electrostatic discharge sensitive devices.

Equipment Operation
Use of this equipment in a manner not specified by U.S. Smoke & Fire may be hazardous. Read and understand the user documentation supplied before installing and operating the equipment. The safety of any system incorporating this equipment is the responsibility of the installer.

Protective Clothing, Face and Eye Protection
Suitable protective clothing, along with eye protection must be worn. Refer to the health and safety guidelines for the equipment before installing the product. If in doubt, contact U.S. Smoke & Fire.



Wear Eye Protection



Wear Protective Clothing



Wear Protective Gloves



Wear Ear Protection



Wear Safety Boots

Electrical Power Supply
Before working on the electrical connections, all of the electrical power lines to the equipment must be isolated. All electrical cables and signal cables must be connected exactly as indicated in these operating instructions. If in doubt, contact U.S. Smoke & Fire.

Contact Us

U.S. Smoke & Fire
12310 Pinecrest Road, Suite 300
Reston, VA 20191

Tel: 888-917-8777
Email : aeteam@ussmokeandfire.com
Web: www.ussmokeandfire.com

Storage

The equipment should be stored in its packaging, in a dry sheltered area.
The Maximum storage temperature is 10°C (18°F) higher than the maximum operating temperature.
The minimum storage temperature is 10°C (18°F) lower than the minimum operating temperature.
Refer to the Technical Specification for details of the operating temperature limits.

Unpacking

Check all packaging for external signs of damage. Check the contents against packing note.

Lifting Instructions

Where items are too heavy to be lifted manually, use suitably rated lifting equipment. Refer to the Technical Specification for weights. All lifting should be carried out in accordance with local and national regulations.

Return of Damaged Items

If any item(s) need to be returned for replacement under warranty, please contact U.S. Smoke & Fire for further instructions. Any item(s) returned to U.S. Smoke & Fire should be adequately packaged to prevent damage during transit. You must include a written report of the problem together with your own name and contact information, address, telephone number, email address etc.

Design and Manufacturing Standards

The Quality Management System of U.S. Smoke & Fire is approved to BS EN ISO 9001:2015 for the design and manufacture of the equipment.

Registered ISO 9001 Management System approvals apply in the USA.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

The protection and certification approval of this product will be invalidated if alterations or additions are made to the structural, electrical, mechanical or firmware components of this system. Such changes will also invalidate the standard terms of warranty.

Before proceeding, the installer should be familiar with NFPA 70 – National Electrical Code, NFPA 72 National Fire Alarm Code, UL1784, UL864 Standard for Control Units for Fire Protective Signaling Systems, UL217 Smoke Detectors, Single and Multiple Station.

Other:
NEC Article 250 Grounding
NEC Article 300 Wiring Methods
NEC Article 760 Fire Protective Signaling Systems
Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction (LAHJ)

Copyright

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Warranty

See U.S. Smoke & Fire terms and conditions.

U.S. SMOKE & FIRE®

ESC Elevator Smoke Curtain

Installation Guide

Installation Guide Contents

PAGE 1 **Packing List**

PAGE 4 **Section 1 - Preparation**

PAGE 8 **Section 2 - Headbox Installation**

PAGE 11 **Optional - Auxiliary, Extension & Stand Off Rail Installation**

PAGE 12 **Section 3 - Curtain Installation**

PAGE 16 **Section 4 - Electrical Hookup**

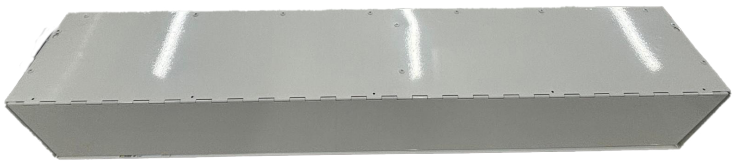
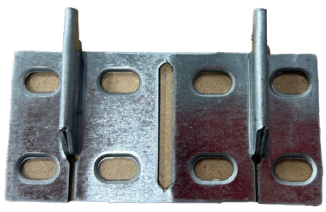
PAGE 21 **Section 5 - Initial Curtain Cycling**

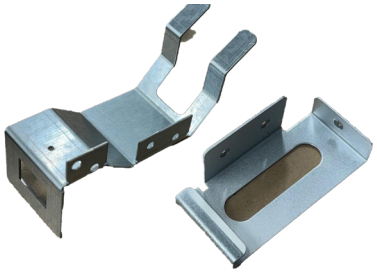
PAGE 23 **Section 6 - Egress Membrane Pad Installation**

PAGE 23 **Section 7 - Door Panel Assembly Fitting**

PAGE 24 **Section 8 - Battery Disconnect (Commission at a later date)**

Packing List

Item	QTY	Description	Image
A	1	ESC Headbox	
B	1	ESC Curtain	
C	2	Seismic Bracket (only for use with Aux rails)	
D	2	Infill Panel (LH & RH) (only for use with Aux rails)	
E	1	Standoff Back Strip (only for use with Aux rails)	
F	1	Ceiling Strip (Assembly optional)	
G	2	Hanging Bracket (LH & RH)	
H	2	Standoff	

Item	QTY	Description	Image
I	2	Install Bracket (LH & RH)	
J	20 (Additional for larger units)	M5 Flange Nut	
K	15 (Additional for larger units)	Powder coated Self Tapping Screws	
L	10	Self Tapping Screws	
M	2	End Caps	
N	2 Sets	Locking Mechanism (LH & RH)	
O	2	Batteries	
P	1	Cord Threading Tool	
Q	1	Membrane Pad	

Item	QTY	Description	Image
R	1	ZENER Diode	
S	6	M4×5 Countersunk Socket Screw	
T	1	Kevlar Cord (Spare 9m, cut on site into two lengths)	NA
U	1	Install Guide	NA
V	1	Drilling Template	NA
W	1 Set	Aux Rails (Supplied Separately)	NA
X	15	Stainless Steel Self Tapping Screws	

Section 1 - Preparation

WARNING

Installers should follow national guidance with regards to lifting requirements, prior to starting the install process.

Note: The ESC system will be delivered pre-wired, field wiring will be required for Mains AC, Fire Alarm Contacts or a Local Smoke Detector.

STEP 1

Ensure you have all the items listed on your order.
(Refer to the *Parts List* on **Page 8**).

Make sure you have the following tools available:

- Tape Measure
- Spirit Level / Laser Level
- Drill driver
- Drill bits (inc. Masonry)
- PZ2 Screwdriver bit (4.8mm Self tappers)
- PH3 Screwdriver bit (Headbox bracket)
- 8mm (5/16") Socket (Nuts – Curtain top rail)
- Wall fixings (Appropriate for the type of wall)
- Ladders
- Rubber mallet
- Flat head screwdriver
- Masking Tape

STEP 2

Unpackage the headbox and remove the mounting brackets from the protective packaging inside the headbox.

CAUTION

Ensure the unpacking area is clean and free from sharp objects. The curtain material is fragile and should be handled with care to prevent damage.



STEP 3

3.1

Attach drilling template (V) to the wall using masking tape.

Note: Ensure that the drilling template is level, centred about the elevator opening and at the required height, before drilling.



3.2

Select appropriate fixings for the substrate being fixed to. eg.

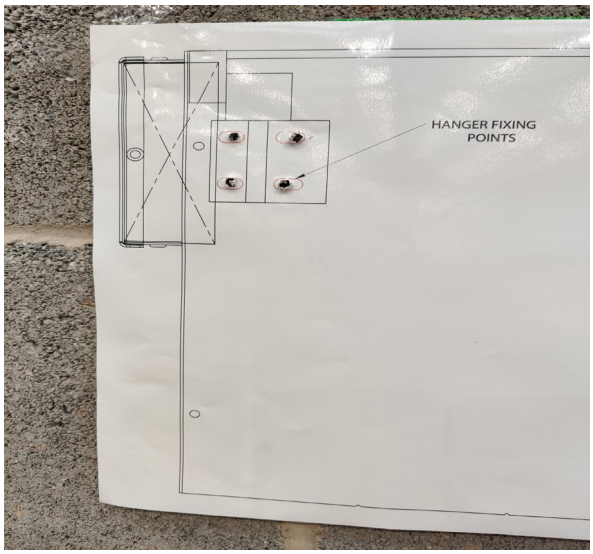
- Wall Anchors for Masonry / Concrete
- Cavity / Drywall / Hollow Wall Anchors for stud walls
- Sheet metal screws for metal stud wall

Note: The recommended screw size is #10, minimum length 1 1/4".

3.3

Drill all the holes shown on the template (V) - all holes are shown in red.





- For Seismic Anchorage, USSF recommends:
- See Section 2. 5.1 for hole locations for drilling.



Note: Seismic mounting holes are optional, only drill after the ESC Headbox has been levelled in Section 2.

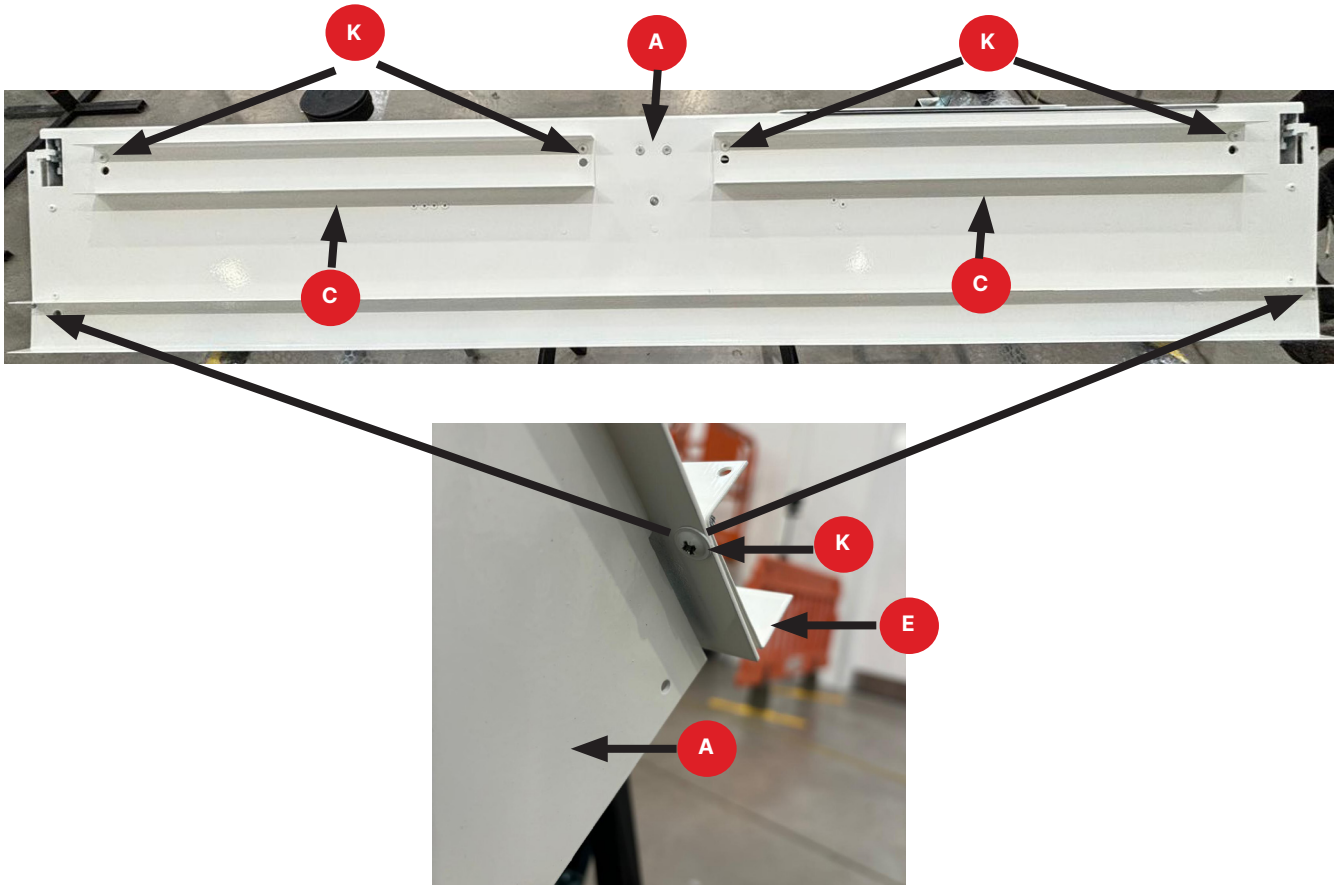
- Recommended - 3/8" Diameter x 3 ½" minimum length

Step 4 - Optional - **Only** follow when installing Aux Rails. Otherwise proceed to Step 5.

STEP 4

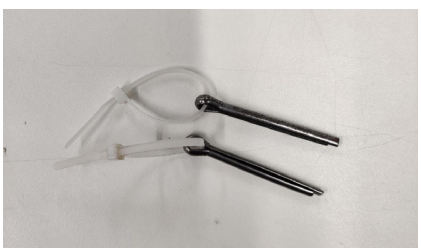
4.1
Assemble Seismic brackets (C) to (A),
Fixings required:
4 x (K) Powder coated self tapping screws.

4.2
Assemble Standoff Backing Strip (E) to (A),
Fixings required:
2 x (K) Powder coated self tapping screws.



STEP 5

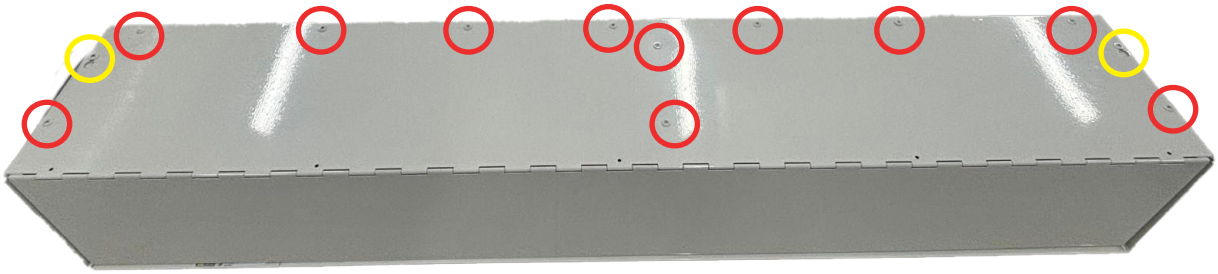
5.1
Remove and discard the transport pins from either side of the Headbox.





5.2

Remove all fasteners highlighted red below, and loosen the key hold fasteners (yellow).



Note: Keep all fasteners for re-assembly.

5.3

Remove the Front Panel and Door Panel assembly.

Remove Roller (B)



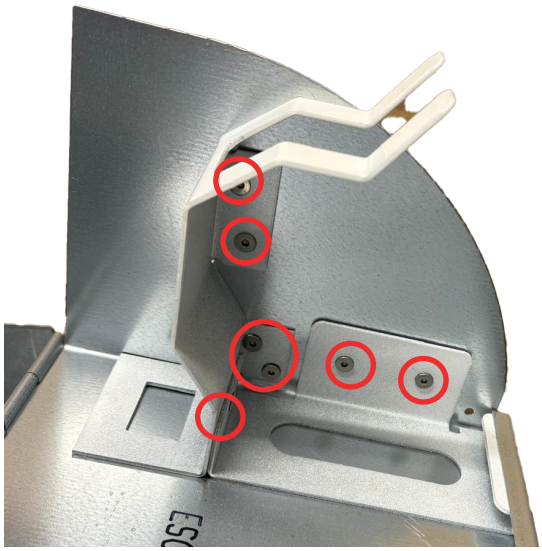
Note: Ensure there are no sharp objects around the Roller and Cover Plate Assembly, to prevent damage.

5.4

Assemble 2x sets of LH & RH Locking Mechanism Brackets (N) to the Door Panel Assembly.

Fixings required:

14 x (S) M4×5 Countersunk Socket Screws (located on the Door Panel Assembly).



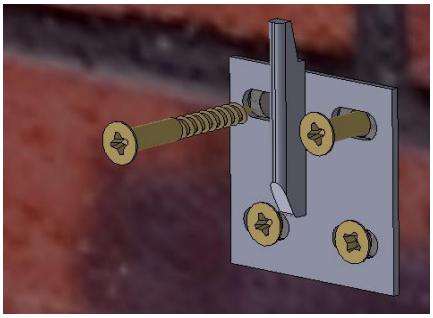
Section 2 - Headbox Installation

STEP 1

1.1

Fix the 2x Hanging Brackets (G) brackets to wall. Ensuring all four fixings are used per bracket.

As per Section 1, 3.2 ensure that an appropriate fixing is selected depending on the substrate being fixed to.



Note: Hanging Brackets (G) are LH & RH - Use the drilling template (V) to ensure correct orientation.



Note: If Aux rails are being fitted (>1”), ensure the Standoff’s (H), are used between the wall and the Hanging Bracket (G).

If Additional adjustment is required, Standoff’s (H) can be used with Aux rails <1” depth.

STEP 2

2.1

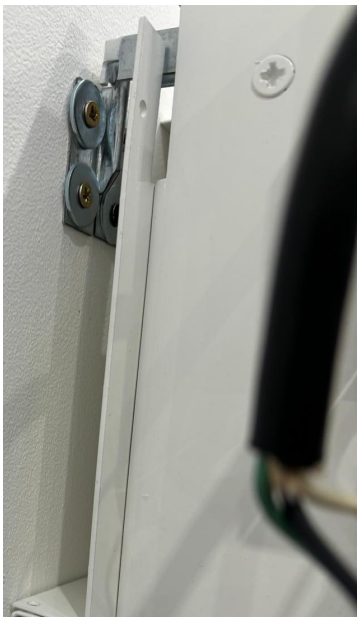
Lift the Headbox (A) onto the Hanging Brackets (G).

Note: The headbox must be securely fitted to both hanging brackets.

Note: Ensure the Headbox is central over the elevator (There is a notch in the bottom edge of Headbox for alignment).

CAUTION

Check the weight of the unit prior to lifting. Due to the overall size of the unit a two person lift maybe required.



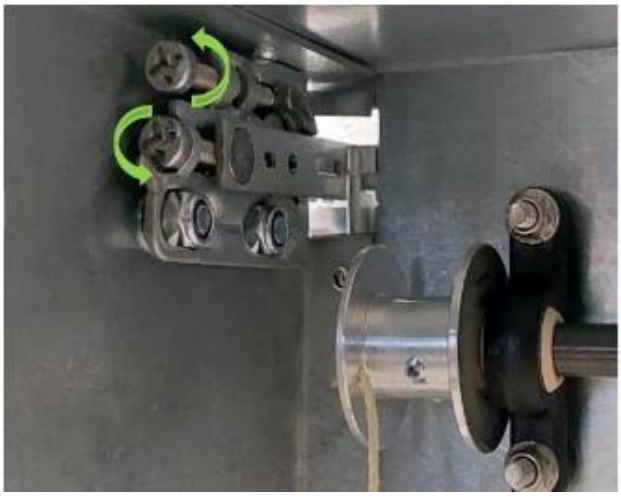
ESC Headbox (A) Adjustment

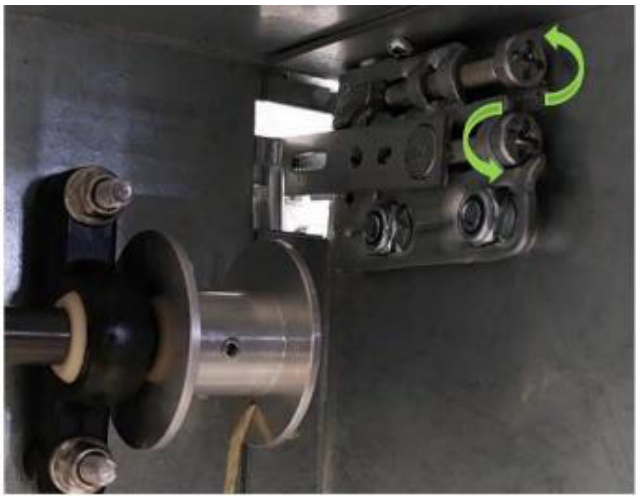
Before fitting the ESC Curtain (B), the ESC Headbox (A) must be levelled along the width and depth of the unit. Failure to do this will result in the ESC Curtain (B) traveling when deploying.

In order to adjust the ESC Headbox (A), the cabinet brackets on the inside of the ESC Headbox (A) can be adjusted, see below for details.

Top screw - Vertical (height) adjustment.
(Clockwise – up / Anti-clockwise - down).

Bottom screw – Distance from wall at top of headbox.
(Clockwise - towards the wall / Anti-clockwise – away from the wall).

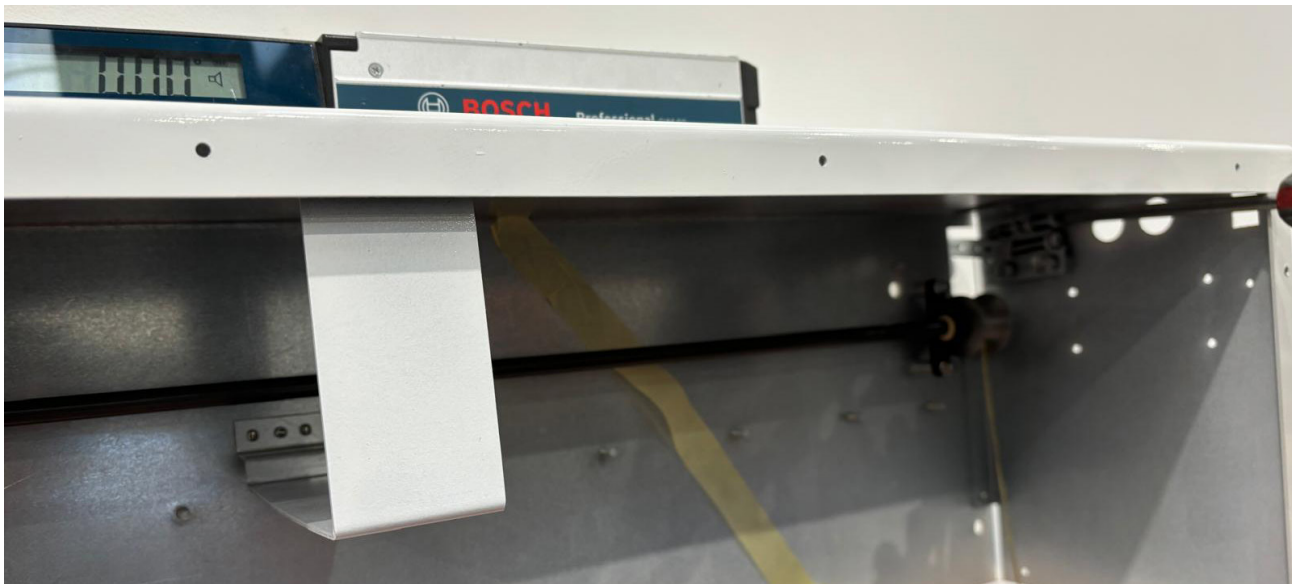




STEP 3

3.1
Adjust the horizontal alignment down the width of the ESC Headbox (1) - **Ensure the reading is 0.00°.**

Note: Check the headbox is level at three points along the headbox and all measurements must be 0.00°.



STEP 4

4.1

Adjust the horizontal alignment down the depth of the ESC Headbox (1) - **Ensure the reading is 0.00°.**

> **Note:** Check the headbox is level at three points along the headbox and all measurements must be 0.00°.

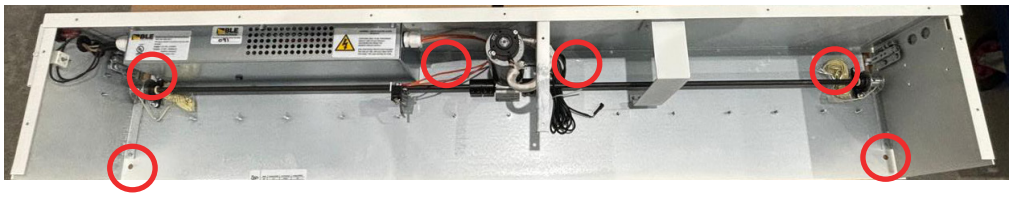


STEP 5

5.1

Optional - Fix the ESC Headbox to the wall using the Seismic Anchorage fixings as per Section 1, Step 3.2.

Drill holes identified below using the ESC Headbox as a template.



STEP 6

6.1

Assemble 2x Infill Panels (D) to the ESC Headbox (A).

Fixings required:

4 x (K) Powder Coated Self Tapping Screws.



If Aux rails **are** required, Progress to **Auxiliary Rail Installation.**

If Aux rails are **NOT** required, progress to **Section 3 - Curtain Installation.**

Optional - Auxiliary, Extension & Stand Off Extension Installation

Auxiliary (Aux) rails are ferretic stainless-steel or powder coated Galv rails onto which the magnetic strips will form a seal in cases where the elevator frame is not itself made from ferretic steel.

The stainless-steel rails fit outside the elevator frame at the required depth to ensure the curtain deploys over the elevator opening.

The rails run from the underside of the headbox down to floor level.

Extension rail (Cavity ceiling installation), additional Auxiliary rails used to bridge the gap between elevator opening and the underside of the ESC headbox.

Auxiliary (Aux) & Extension Rail Installation

STEP 1

1.1
The aux rail kit (if supplied) consists of:
- Aux rail backer strip (W) x2,
- Aux rail front rail (W) x2 (length to suit backer strip) Can be supplied in stainless steel or powder coated finish, with depths of 1/2”, 3/4”, 1” or 1½”,
- Stainless Steel Self Tapping Screws (X) x12.

Note: Aux rails are supplied in varying depths to suit the elevator surround / frame / jamb. Aux rail must stand proud of elevator frame to allow proper function

STEP 2

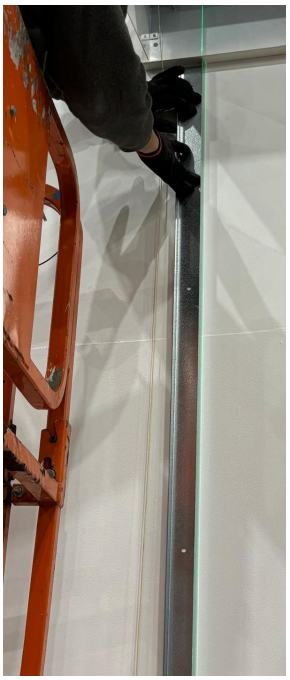
2.1
Measure from underside of Standoff Backing Strip (E) to the top of the elevator frame (for ferretic frame) or floor level (for full length Aux rails).

2.2
Align the Aux / Extension rail (W) backing strip with the notches on the bottom edge of the headbox, either side of the opening.

2.3
Secure the backer rail in this position to the wall through the top most hole.
Ensure that an appropriate fixing is selected depending on the substrate being fixed to.

2.4
Secure the backing rail to the wall through the remaining holes ensuring it remains plumb. (If the rails have been cut, ensure there is a hole no more than 2” from each end to secure to the wall)

2.5
Secure the Aux rail front (W) to the backer using Stainless Steel Self tapping screws (X).





Note: Aligning the auxiliary rails with the elevator frame may lead to misalignment, ensure the rails are fitted and secured plumb using a spirit level or laser level.

Section 3 - Curtain Installation

STEP 1

1.1
Remove the ESC Curtain (B) from the packaging.



> **Note:** Ensure the area is clean and there are no sharp objects near the curtain.

1.2
Take the ESC Curtain (B) up to the headbox.

> **Note:** Requires two people.

1.3
Remove the securing masking tape.
Peel back the metallic retaining bar.

> **Note:** Ensure the adhesive backing is facing the internal surface of the headbox.

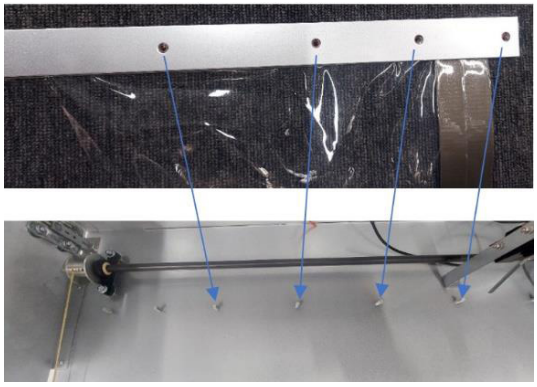
1.4
Line up the retaining bar with the pressed studs.

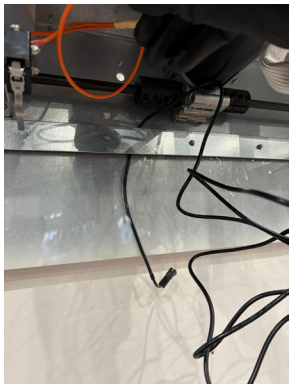
> **Note:** Ensure all the studs are aligned correctly. Before pressing into place.

Remove the red backing.

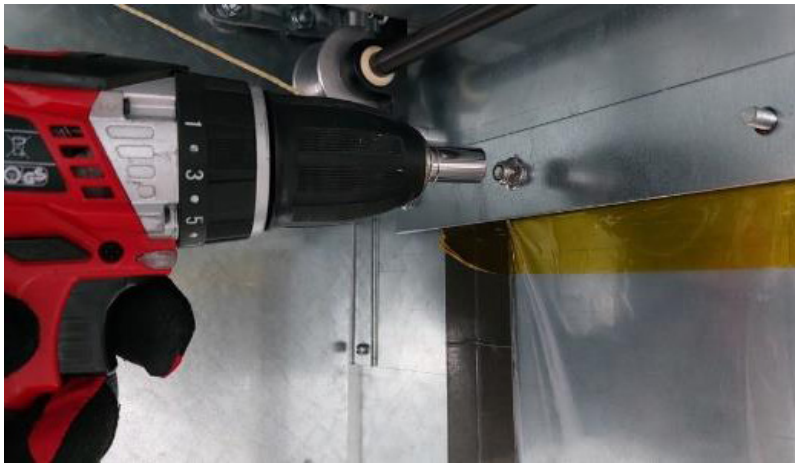
Press the retaining bar onto the studs.

> **Note:** Ensure the ESC Membrane cable is fed behind the ESC Curtain (B) retaining strip before pressing into place.





1.5
Use M5 flange nuts (J), fix the retaining bar in place.

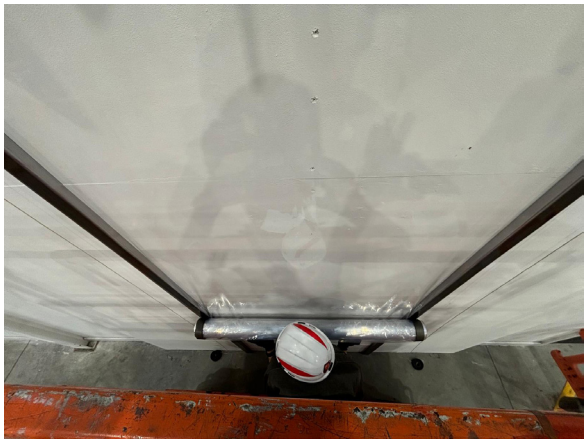


STEP 2

2.1

Roll the ESC Curtain (B) down over the opening.
Remove the Kevlar Cord from the packaging inside the ESC Headbox (A) and allow to fall to the ground.

Note: Take care not to crease or damage the curtain or magnetic strips.



2.2

Ensure that the magnets are vertically straight before progressing.

Note: This can be done by pulling the magnets away and re-aligning. Make sure there are no creases in the curtain material.



STEP 3

3.1

Fix the End Caps (M) to the Kevlar Cord.
Tools Required:
Cord Threading Tool (P)
Process:
Feed the Cord Threading Tool (P) through the entry hole (see below).



3.2

Pull the Kevlar cord through the end of the Cord Threading Tool (P).



3.3

Pull the Cord Threading Tool (P) through the End Cap (M).



3.4

Tie a knot in the end of the Kevlar Cord.

3.4.1 Create a loop in the end of the Kevlar Cord.

3.4.2 Twist the Kevlar cord to create a second loop.

3.4.3 Feed the end of the Kevlar cord through the second loop.

3.4.4 Pull the end of the Kevlar cord tight.

3.4.5 Pull the Kevlar cord so the Knot sits inside the End Cap (M).

3.4.1



3.4.2



3.4.3



3.4.4



3.4.5

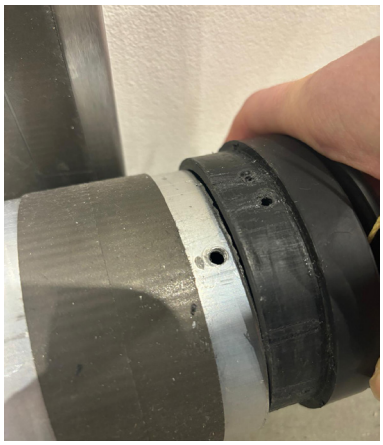


Note: Repeat this process for the second End Cap (M).

STEP 4

4.1
Wind the excess Kevlar cord onto the End Cap (M).
Right side - Wind Clock wise
Left side - Wind Anti-Clock wise

4.2
With the End Cap (M) orientated inwards towards the ESC Roller (B), wrap the Kevlar cord tightly round the slot. Tension the End Cap as per the image below.



4.3
Push the End Cap (M) into the end of the ESC Roller (B). This should require extra force to ensure there is tension in the Kevlar Cord.



Note: Check the Kevlar cord tension by horizontally tapping the cord. The tension in each cord should be the same.

Note: A rubber mallet may be used to ensure the roller end caps are seated correctly within the roller tube.

4.3
Repeat on opposite side and secure both end caps using Self Tapping Screws (L) through pre drilled hole in the ESC Curtain tube (B).

Left Side

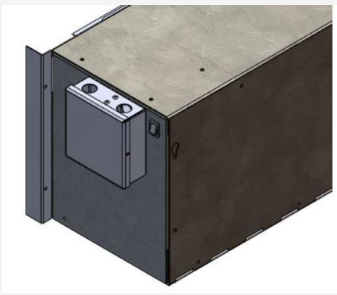


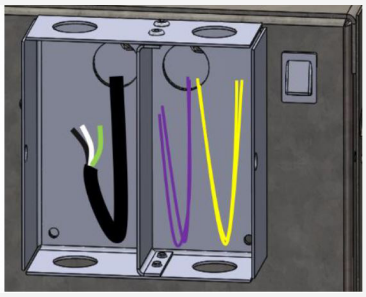
Right Side



Section 4 - Electrical Hookup

The image below shows the wiring connections which are required to be made on site during installation. IMPORTANT – All connections must be made in the Junction Box, and contained in protective conduit.
Field connections to be made inside junction box (Left hand side is high voltage AC mains, Right hand side is connections for FACP or smoke detector).





AC power – (Black, White & Green) Live, Neutral and Ground connections to be made to flying leads.

Fire Alarm Control Panel (FACP) – If a connection to FACP is to be made, using the purple pair, connecting one of each cable to the FACP cables. (Connection to FACP must be to a local relay module in the same room) If FACP is not to be used, connect both purple cables together.

Single Pole Switch

Located on the End Plate.

'I' - State during normal operation - Roller will remain in the Headbox
'O' Open circuit - simulate a signal from the FA ONLY.
Roller will deploy.



Local Smoke Detector Input – Local smoke detector is to be connected using the yellow cables. Ensure end of line resistor is fitted to smoke detector base. (see diagram below for linking multiple ESC to 1 detector).

Depending on required Start up - go to the required section below:

Section 4.1 - Start up with Batteries (To be mains commissioned at a later date or as part of a multi ESC configuration) - Entry via Headbox Access Cover.
Section 4.2 - Start up with Batteries (To be mains commissioned at a later date or as part of a multi ESC configuration) - Entry via Electronic Enclosure.
Section 4.3 - Start up with Mains AC.

Section 4.1 - Start up with Batteries
(Via Headbox Access Cover)

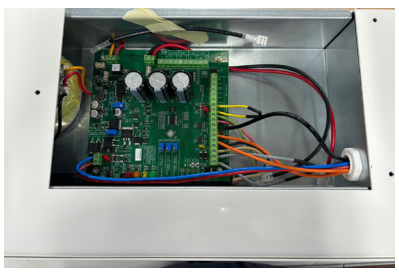
STEP 1

1.1
Ensure the Panel Mount Switch is in the '0' position.





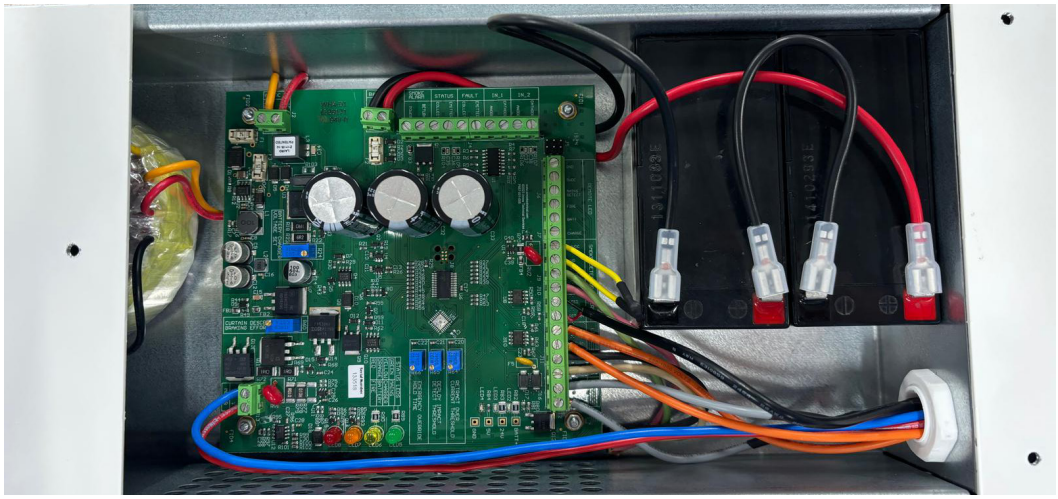
1.2
Remove the ESC Headbox (A) Access Cover.
Tool Required: 2.5mm Allen Key



1.3
Remove the Battery link cable (supplied taped to the enclosure).

1.4
Place the Batteries (O) into the Electronic enclosure. Ensure the terminals are towards the input wiring.

1.5
Connect the 'Red' battery cable to the outer 'Red' spade terminal
Connect the 'Black' battery cable (from the Control PCB) to the outer 'Black' spade terminal.
Connect the loose battery link cable to the central 'Black' and 'Red' spade terminals.



1.6
If the ESC system is going to be fully commissioned, refit the ESC Headbox Access Cover and **proceed to Section 5**.

OR,

If the ESC system is going to be commissioned at a later date, Do Not refit the ESC Headbox Access Cover and **proceed to Section 5**.

OR,

If the ESC system is going to be fully commissioned and has had the Start up with Mains AC (Section 4.3) refit the ESC Headbox Access Cover and **proceed to Section 7**.

Section 4.2 - Start up with Batteries
(Via Electronic Enclosure)

STEP 1

1.1
Ensure the Panel Mount Switch is in the '0' position.



1.2
Remove 3x M5 Flange Nuts

Gently pull the Electronic Enclosure away from the ESC Headbox (1), the right side will naturally hang lower than the left.



1.3

Remove the Battery link cable (supplied taped to the enclosure).

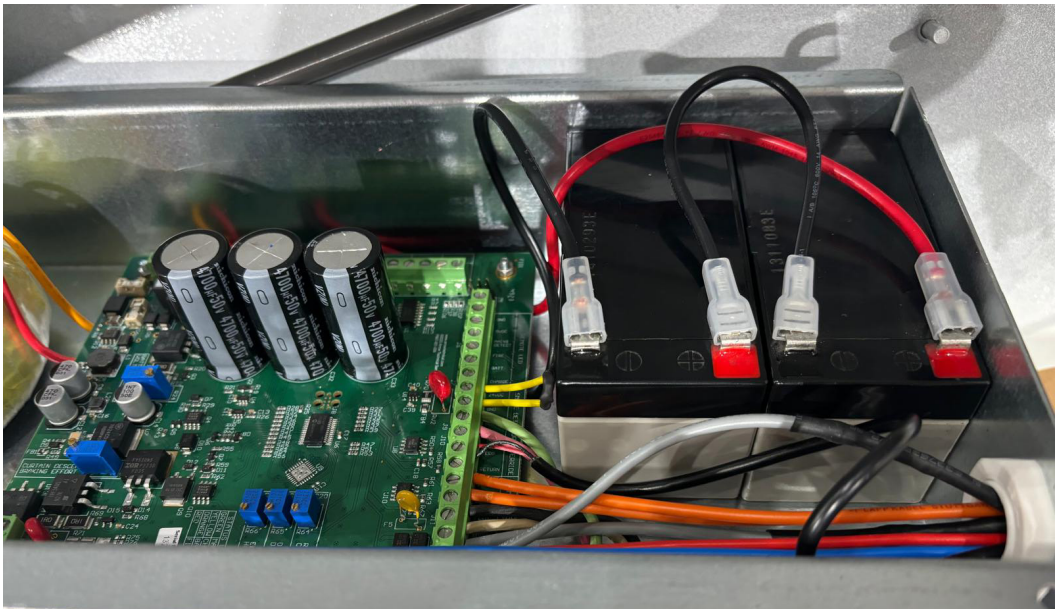


1.4

Place the Batteries (O) into the Electronic enclosure. Ensure the terminals are towards the input wiring.

1.5

Connect the ‘Red’ battery cable to the outer ‘Red’ spade terminal
Connect the ‘Black’ battery cable (from the Control PCB) to the outer ‘Black’ spade terminal.
Connect the loose battery link cable to the central ‘Black’ and ‘Red’ spade terminals.



1.6

Gently lift the Electronic Enclosure back into position,

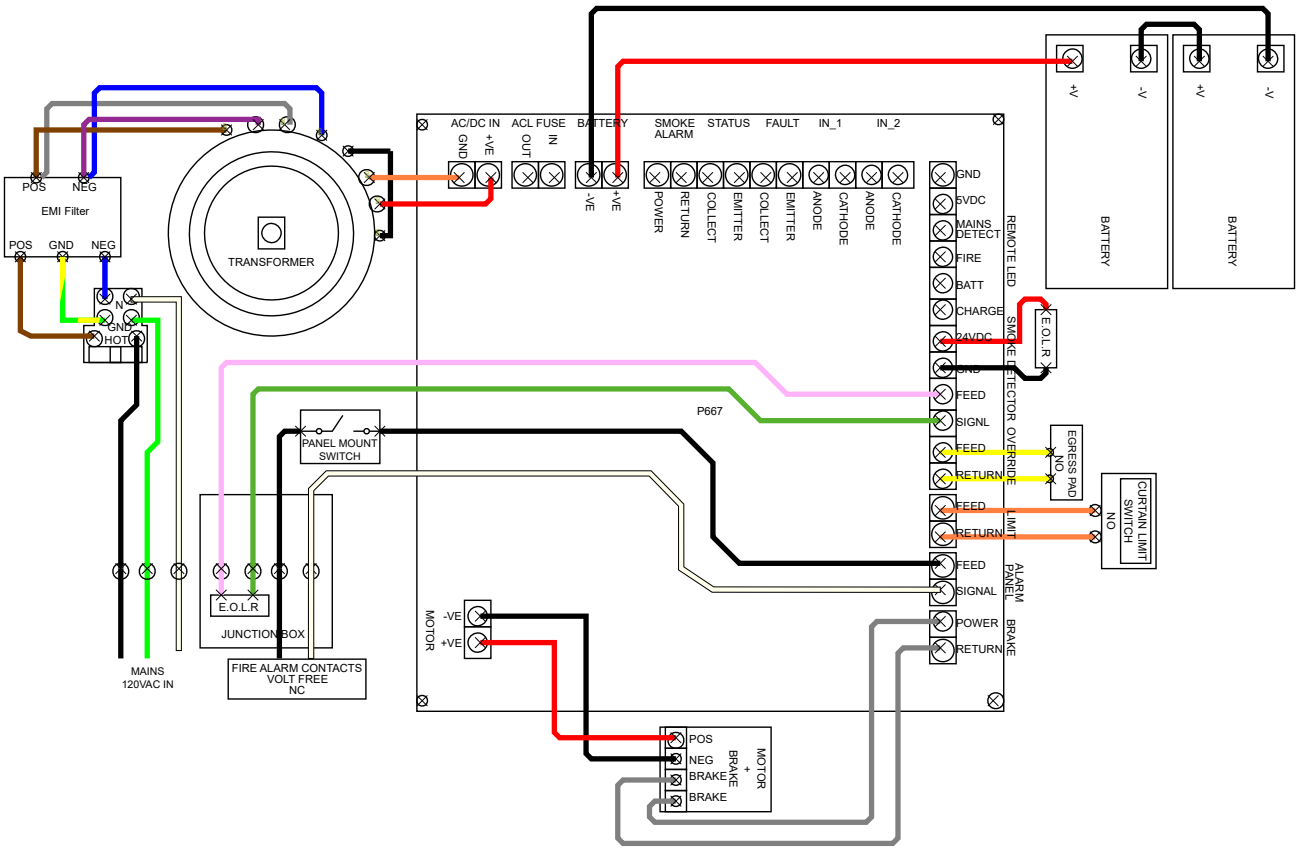
Re-assemble the 3x M5 Flange Nuts, removed in Step 1.2.



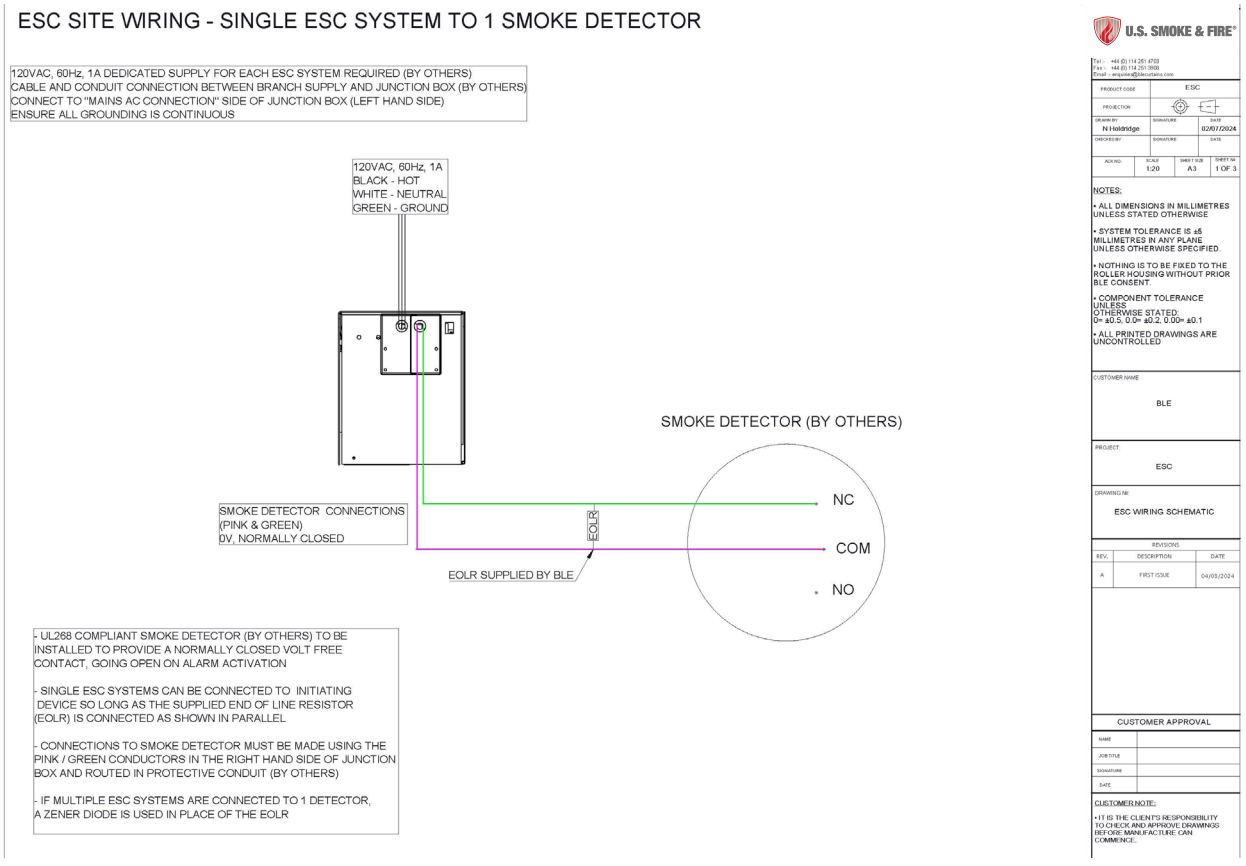
Proceed to Section 5.

Section 4.3 - Start up with Mains AC

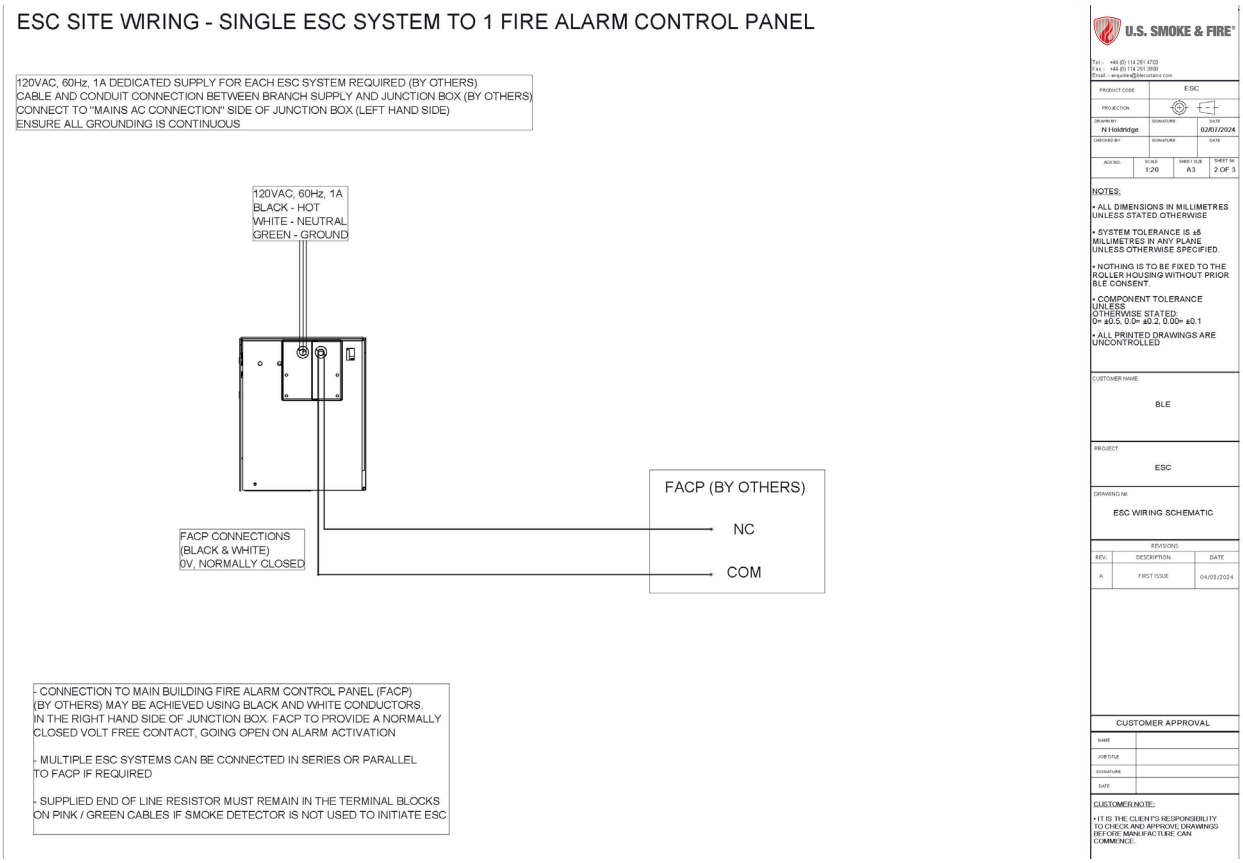
Wiring Diagram - ESC Schematic



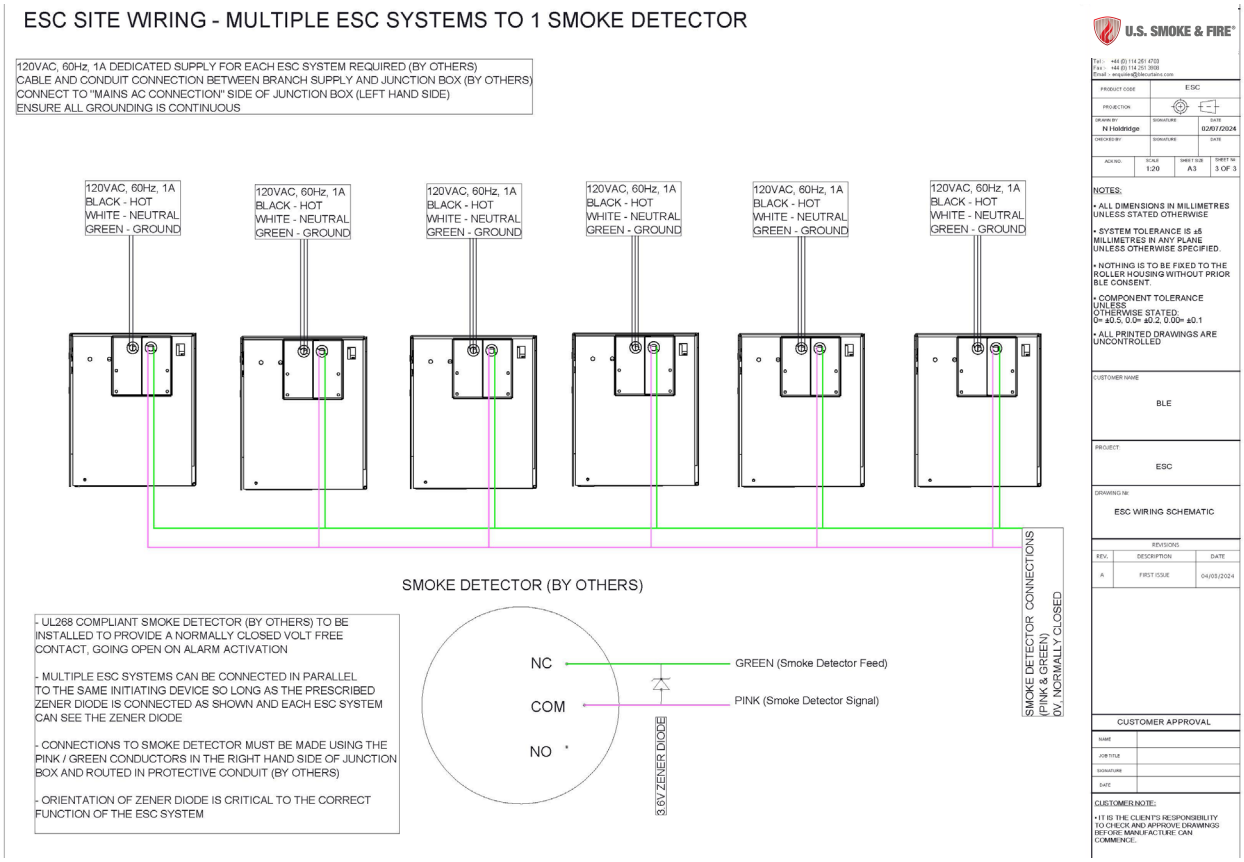
Single ESC Site Wiring to 1 Smoke Detector



Single ESC Site Wiring to 1 Fire Alarm Control Panel (FACP)



Multiple ESC Systems to 1 Smoke Detector



Section 4.3 - Start up with Mains AC Cont.

Once the ESC wiring is complete - Connect the Batteries (O).

Proceed to Sections 4.1 or 4.2 depending on Access to the ESC Headbox (A).

Section 5 - Initial Curtain Cycling

STEP 1

1.1
Switch the Panel Mount Switch to the 'I' position.



Note: The curtain should roll up to the headbox.

1.2
Switch the Panel Mount Switch to the '0' position.



Note: The curtain should return to the original set position.

1.3
Repeat steps 1.1 and 1.2 for a minimum of 5 cycles. During these cycles, identify if the ESC Curtain magnets are travelling to the left or right, or if there are any areas of the magnet that are not sealed against either the elevator frame or Aux rails.

CAUTION
During step 1.3, if any of the images below are witnessed further adjustment is required. The cause of travel or areas of unsealed magnets is tension in the Kevlar Cord.
Proceed to Step 2







CAUTION

Kevlar Cord tension should always be increased on the opposite side to the direction of travel (e.g. ESC roller travels to the right, increase tension on the left End Cap).

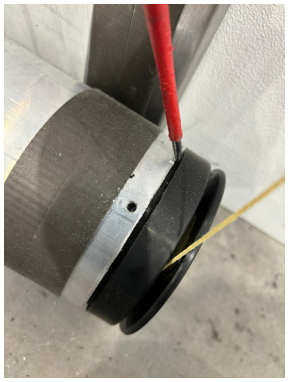
NOTE: On an unjointed ESC Curtain, the magnet must have a minimum of 20mm width of magnet sealed to the elevator frame or Aux rail to comply with UL 1784. However, a jointed ESC Curtain must have the full width of 40mm sealed to the elevator frame or Aux rail to comply with UL 1784.



STEP 2

2.1
Remove the opposite end cap on the side of the direction of travel. Removing all self tapping screws.

Place the flat of the screw driver between the joint of the end cap and the roller.
Gently tap the screw driver until a gap is created.
Repeat at alternative points around the roller until the End Cap becomes loose.



2.2
Rotate the End Cap, so there is a difference in hole positions of approx. 1/8" inch.

Rotating the End Cap will increase tension.

2.3
Re-fit the End Cap. Ensure Self Tapping Screws are re-fitted.

2.4
Repeat Steps 1.1 to 1.3

Note: Always re-align the magnets prior to further adjustments.

Repeat Steps 2.1 to 2.4 until the ESC Curtain deploys centrally along the elevator frame or Aux Rails.

STEP 3

3.1
If the roller pulls away from the frame, repeat step 1.1 to 1.4
NOTE: Tension the End Cap opposite to the side which is pulling away from the frame.

3.2
Once corrected, cycle the system 10 times to ensure consistency.

Section 6 - Egress Membrane Pad Installation

STEP 1

1.1
Measure 42” from the floor level and place a section of masking tape on the ESC Curtain.

1.2
Measure the clear opening of the ESC Curtain and mark the centre point on the Masking tape.

1.3
Any excess cable should be coiled in the Headbox and zip tied to the motor body. Ensure the cable is away from any moving parts.

1.4
Switch the Panel Mount Switch is in the ‘I’ position to retract the ESC Curtain.

1.5
Switch the Panel Mount Switch is in the ‘0’ position to deploy the ESC Curtain.

1.6
Allow the ESC Curtain to deploy until you can access the rear of the masking tape.

1.7
Remove the backing on the ESC Egress Membrane Pad (Q) and locate centrally above the masking tape.

Note: The Egress Pad will not be able to be removed once in place without causing damage to the ESC Curtain.

Note: Ensure there are no air pockets between the Egress Pad the ESC Curtain.

1.8
Connect the Egress Membrane pad (Q) with the connection cable from the ESC Headbox.

1.9
Allow the ESC Curtain to deploy to floor level. If the magnets have become mis-aligned, pull them away from the fame and re-align.

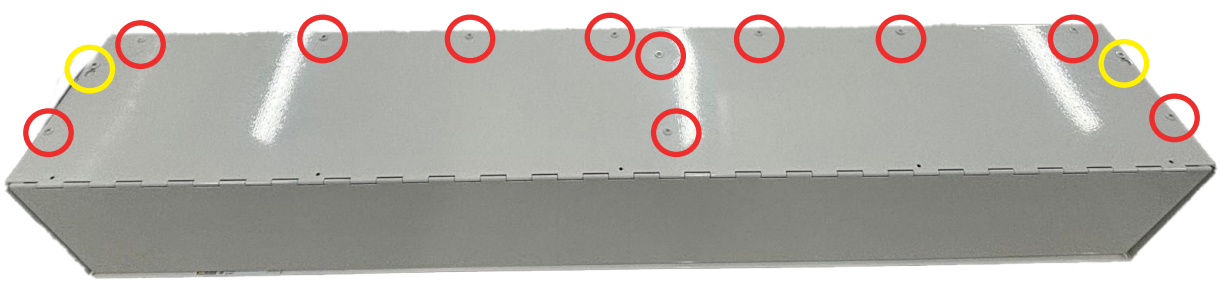
Section 7- Door Panel Assembly Fitting

STEP 1

1.1
Rest the Cover Plate Assembly on the 2 screws (Yellow) left in the ESC Headbox.

1.2
Refit all Self Tapping Screws which were removed in Section 1, Step 5.2.

Note: Ensure the curtain is deployed, before fitting the Door Panel Assembly.



Section 8 - Battery Disconnect (Commission at a later date)

STEP 1

1.1

If the Start Up was carried out with Batteries and the full Mains Commissioning is at a later date the Batteries **MUST** be disconnected.

If the ESC is to be left, without power from either the Mains AC or the batteries DC, fit the Install Brackets (I). This will prevent the ESC Curtain from deploying.

1.2

Switch the Panel Mount Switch to the 'I' position to retract the ESC Curtain.

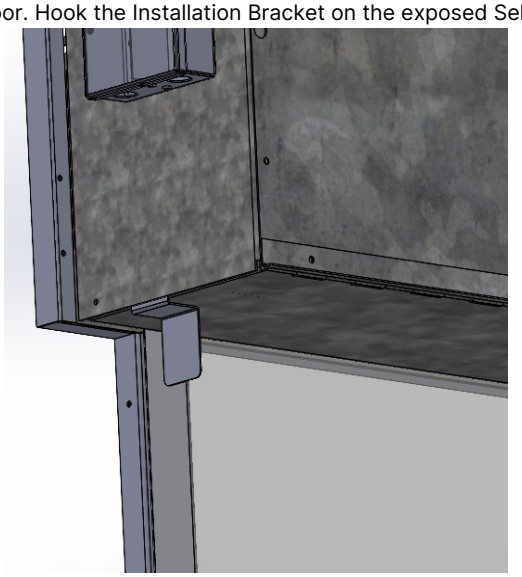
1.3

Fit a Self Tapping Screw (K), as shown below. The fixing should be located on the Non-Junction Box End Panel.



1.4

Fit the LH & RH Install Brackets (I), slide the bracket between the inside of the ESC Headbox (A) and the Roller Door. Hook the Installation Bracket on the exposed Self Tapper thread.





1.5

Disconnect the Batteries.

Depending on access to the Electronics Enclosure,

If Section 4.1 was carried out:

Remove the Battery cables Red and Black spade connections to the batteries.
Re attach the Access Cover.

If Section 4.2 was carried out:

Repeat the steps in section 4.2, however;
Remove the Battery cables Red and Black spade connections to the batteries.
Re attach the Electronics Enclosure.

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