ESG switchable™

LCD PRIVACY GLASS

Product Specification Guide:

ESG - HD1 Controller
ESG - 4K Controller
ESG - JB Junction Box
ESG - WWS Wireless Switch

High Definition
Switchable Privacy Glass Controller

Description

The LCD-HD2 is an advanced controller for driving LCD privacy glass. It uses industry unique duty cycle and voltage variation to achieve market leading control of LCD film transparency. The special drive signal gives visual clarity of the LCD that exceeds that achievable with a simple transformer. The LCD-HD2 dynamically calculates expected current and protects the LCD by ensuring the current is within safe limits at all times. To avoid the problem of flicker when the update frequency of the panel is at a slightly different frequency to the supply frequency, the LCD-HD2 allows for the selection of Supply Sync which ensures the output of the LCD-HD2 exactly matches the supply waveform and frequency. Advanced communications abilities allow for status monitoring and configuring via the RS485 interface.

Technical Data

Electrical data	Supply voltage	230V AC (nominal)
	Output voltage	65V AC (nominal)
	Output current	155mA/m^2 (nominal)
Functional data	LCD drive area	Typically up to 4m^2 **
Communication	RS485	2 x comms ports for connecting to additional controllers in Master-Slave configuration
Environmental	Storage temperature	-20 to +85°C
	Working temperature	-10 to +40°C (ensure adequate ventilation)
	Relative humidity	0-90% non-condensing
Connections	Mains in	3 pin IEC plug
	LCD Output	Black 2 pin connector. Max wire size 1.3mm^2
	Low voltage control	Green 2 pin connector. Max wire size 1.3mm^2
	High voltage control	Grey 2 pin connector. Max wire size 1.3mm^2
Mechanical	Dimensions	255x150x73mm (without connectors)
	Weight	1720g
Mounting	Two horizontal key holes at rear	Centres of 230mm

** 6m² possible dependant on application

Integrated features include:

- **LCD protection** to protect against excessive current draw
- **Supply Sync** to synchronise the controller and main supply frequencies to minimise flicker
- **Advanced communications** via an RS485 communications interface to allow for programming and status monitoring.
- **Remote control** options including wireless wall mounted switch and keyfob style remote

Power Supply Requirement

Each controller needs its own 13A 230v plug socket within 0.5m of controller installation location.

Switching Control Methods

At the time of placing order, switching method must be confirmed by the customer so that the controller can be configured correctly. If changes need to be made after installation there maybe a reconfiguration charge.

230V AC Switching: The unit can accept 230v switched live switching via traditional style wall mounted light switch. This must be connected into the grey switch input on the controller..

Wireless Switching: The unit can be fitted with a wireless receiver to enable control via wireless switches.They are available as either a wall mounted switch or a keyfob style remote.

Can also be supplied in gloss back options

BMS Systems: Using the green low voltage input we are able to connect into most of the BMS systems currently available. Due to the slight differences in how each system works we will need to know exact system to configure the controller. This will enable control via the BMS control panel or smart phone / tablet if they are connect to the BMS.

Multiple Panel Installations

The total drive area of the HD-2 can be split over multiple panels so long as the total meterage does not exceed the maximum drive area. For example, if the application means the total drive area is 4m², this can be split up as:

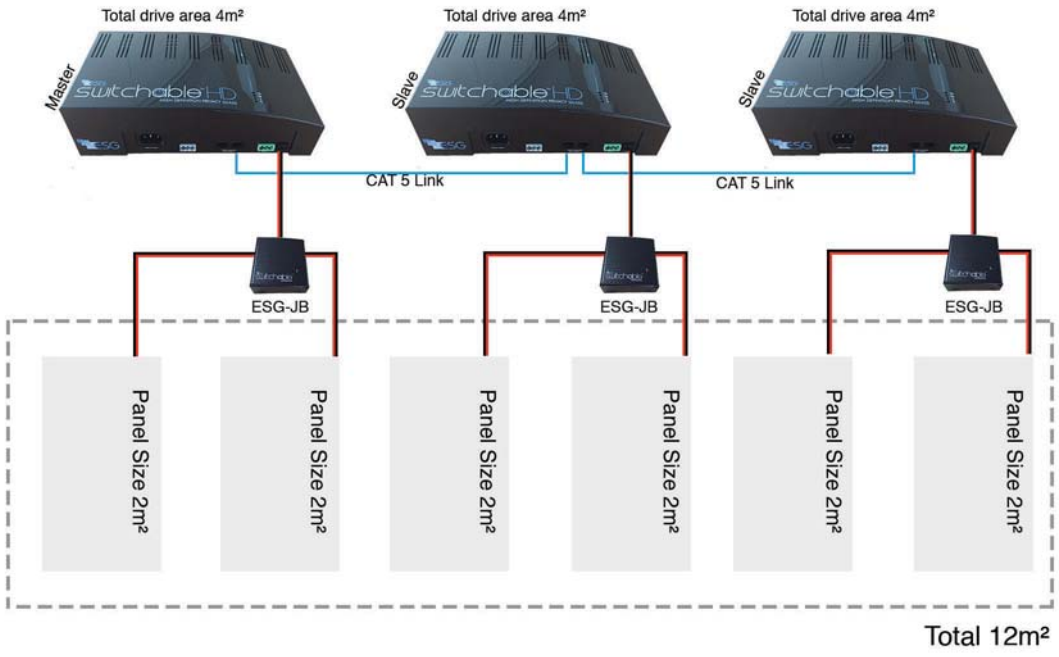
1 x 4m² panel
2 x 2m² panels
4 x 1m² panels

For installs requiring more than panel to be connected to the controller, we recommend using an ESG-JB junction box to make installation easier.

Multiple Controller Installations

For installations that exceed the maximum drive meterage of the controller it is possible to connect the controllers together to achieve the required power. They are connected via the RS485 ports using a standard CAT 5 cable. This allows the panels in the installation to be wired to different controllers but all be controlled together. This is called Master/Slave configuration. The 'master' is the unit that receives the switching signal, the connected 'slave' units are then told by the master unit to switch their connected panels.

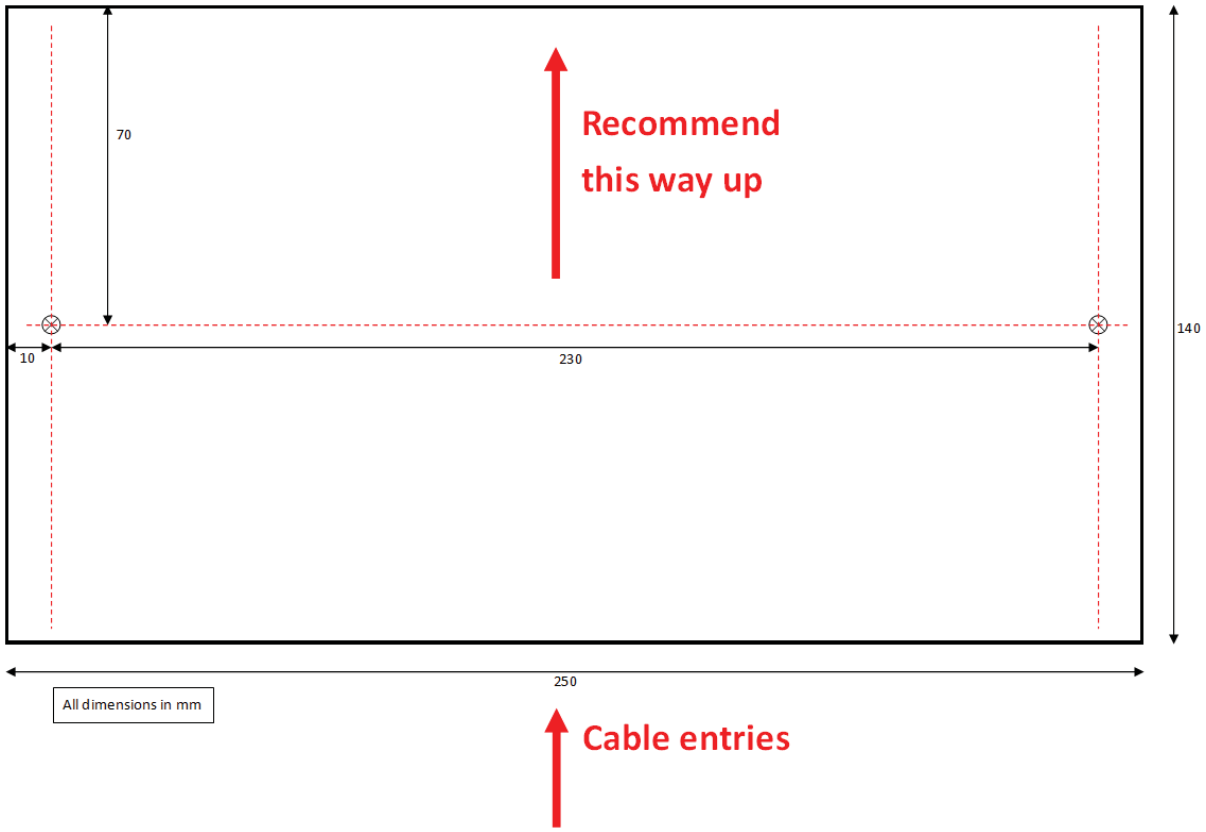
e.g.



Mounting

The unit should be mounted either horizontally (base flat) or preferably vertically (as below). Vertical mounting on a wall for example is achieved by using two screws in the wall and sliding the unit's key slots over the screws.

Mounting layout



Screw head sizes must be larger than 5mm dia and smaller than 8mm dia.

Ultra High Powered
Switchable Privacy Glass Controller

Description

The ESG-4K is the newest in the advanced range of controllers for driving LCD privacy glass. It uses the same industry unique duty cycle and voltage variation to achieve market leading control of LCD film transparency as the HD-1. The special drive signal gives visual clarity of the LCD that exceeds that achievable with a simple transformer. The ESG-4K dynamically calculates expected current and protects the LCD by ensuring the current is within safe limits at all times. To avoid the problem of flicker when the update frequency of the panel is at a slightly different frequency to the supply frequency, the ESG-4K allows for the selection of Supply Sync which ensures the output of the ESG-4K exactly matches the supply waveform and frequency. Advanced communications abilities allow for status monitoring and configuring via the RS485 interface. New features on the ESG-4K include an internal real time clock to automatically monitor the operational periods of the switchable film and an exclusive bluetooth application to control the switchable glass panels.

Technical Data

Electrical data	Supply voltage	230V AC (nominal)
	Output voltage	65V AC (nominal)
	Output current	155mA/m^2 (nominal)
Functional data	LCD drive area	Typically up to 20m^2 **
Communication	RS485	2 x comms ports for connecting to additional controllers in Master-Slave configuration
Environmental	Storage temperature	-20 to +85°C
	Working temperature	-10 to +40°C (ensure adequate ventilation)
	Relative humidity	0-90% non-condensing
Connections	Mains in	3 pin IEC plug
	LCD Output	Black 2 pin connector. Max wire size 1.3mm^2
	Low voltage control	Green 2 pin connector. Max wire size 1.3mm^2
	High voltage control	Grey 2 pin connector. Max wire size 1.3mm^2
Mechanical	Dimensions	260 x 223 x 66mm (without connectors)
	Weight	1850g
Mounting	Two horizontal key holes at rear	Centres of 236mm

** 15m² max dependant on application

Integrated features include:

- **LCD Protection** to protect against excessive current draw
- **Supply Sync** to synchronise the controller and main supply frequencies to minimise flicker
- **Advanced communications** via an RS485 communications interface to allow for programming and status monitoring.
- **Remote control** options including wireless wall mounted switch and keyfob style remote
- **LCD Preservation** monitors the LCD film usage and switches the panels off automatically at times when the glass is not being used to prolong film lifespan
- **Bluetooth Application** made exclusively for the ESG-4K allows full control of the ESG Switchable controllers from smart phones and tablets not connected to BMS. This includes on/off function, multiple controller function and fader control

Power Supply Requirement

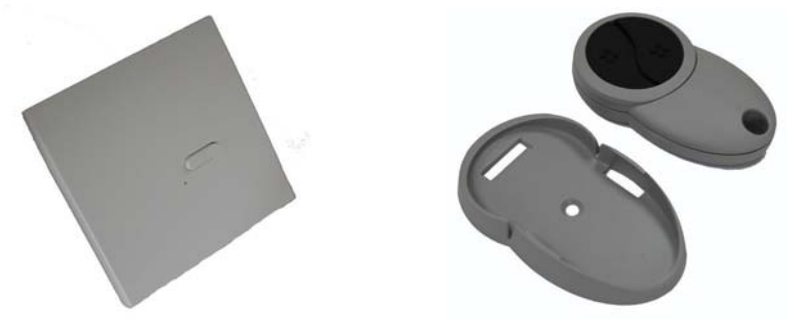
Each controller needs its own 13A 230v plug socket within 0.5m of controller installation location.

Switching Control Methods

At the time of placing order, switching method must be confirmed by the customer so that the controller can be configured correctly. If changes need to be made after installation there maybe a reconfiguration charge

230V AC Switching: The unit can accept 230v switched live switching via traditional style light switch. This must be connected into the grey switch input on the controller.

Wireless Switching: The unit can be fitted with a wireless reciever to enable control via wireless switches. They are availble as either a wall mounted switch or a keyfob style remote.



Can also be supplied on gloss back options

BMS Systems: Using the green low voltage input we are able to connect into most of the BMS systems currently available. Due to the slight differences in how each system works we will need to know exact system to configure the controller. This will enable control via the BMS control panel or smart phone / tablet if they are connect to the BMS.

IOS / Android App: ESG have developed an app exclusive to the 4K which gives users full control (including fader control) of the switchable glass via smart phones and tablets that are not connected to BMS systems

On / Off screen shots of ESG-4k app

Multiple Panel Installations

The total drive area of the ESG-4K can be split over multiple panels so long as the total meterage does not exceed the maximum drive area. For example, if the application means the total drive area is 20m², this can be split up as:

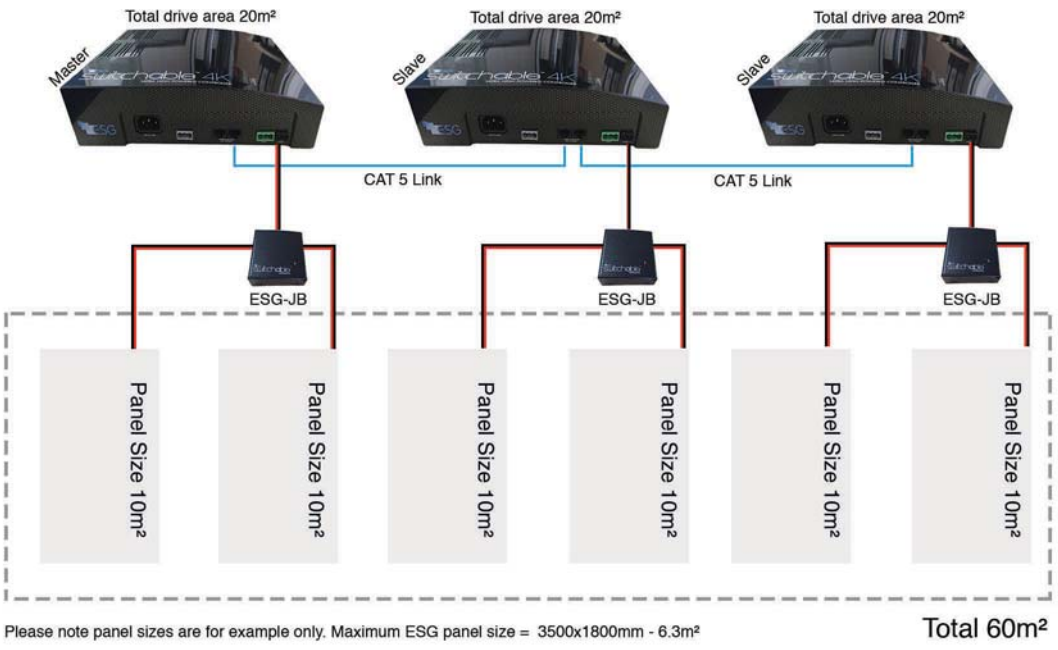
5 x 4m² panels
10 x 2m² panels
20 x 1m² panels

For installs requiring more than panel to be connected to the controller, we recommend using an ESG-JB junction box to make installation easier

Multiple Controller Installations

For installations that exceed the maximum drive meterage of the controller it is possible to connect the controllers together to achieve the required meterage drive. They are connected via the RS485 ports using a standard CAT 5 cable. This allows the panels in the installation to be wired to different controllers but all be controlled together. This is called Master/Slave configuration. The 'master' is the unit that recieves the switching signal, the connected 'slave' units are then told by the master unit to switch thier connected panels.

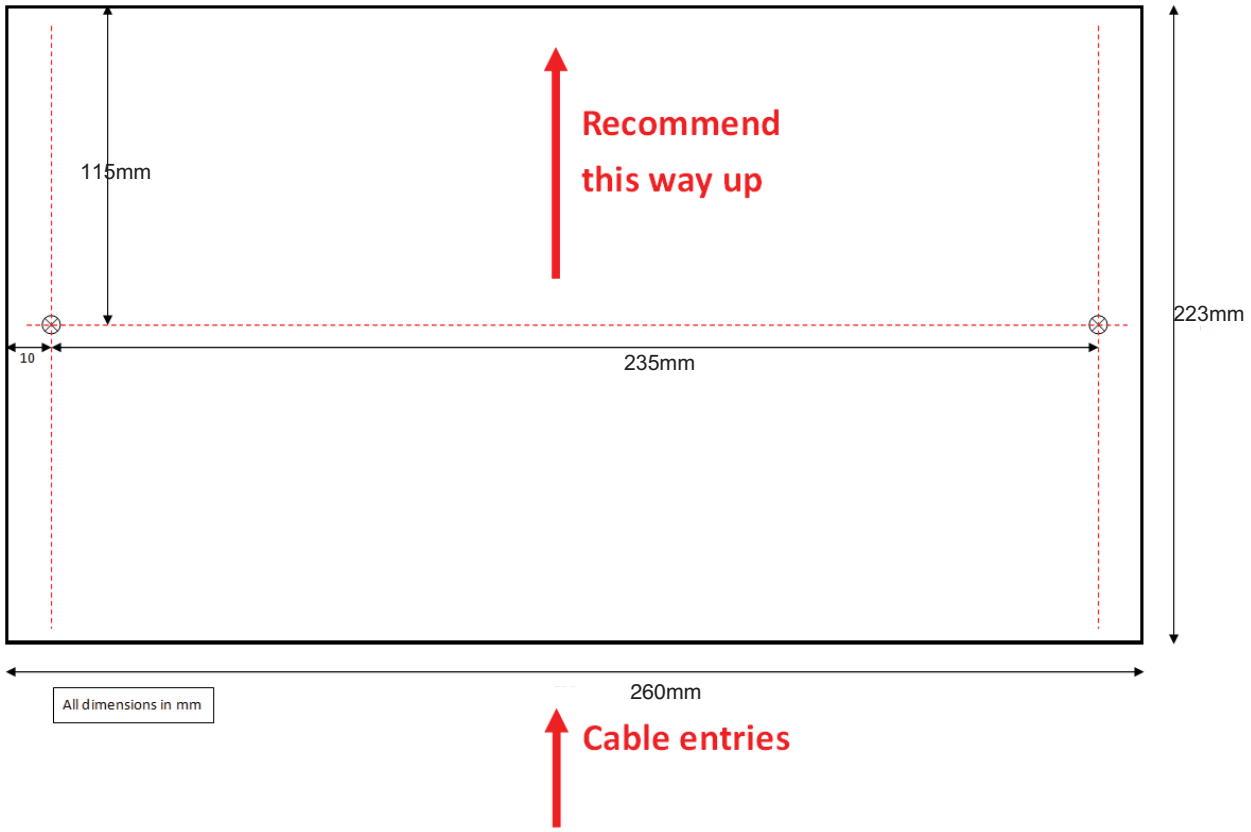
e.g.



Mounting

The unit should be mounted either horizontally (base flat) or preferably vertically (as below). Vertical mounting on a wall for example is achieved by using two screws in the wall and sliding the unit's key slots over the screws.

Mounting layout



Screw head sizes must be larger than 5mm dia and smaller than 8mm dia.

Warranty For both the HD-5 and the 4K

The controller is covered by a 5 year return to base warranty against faulty components or manufacturing.

Glass panels are covered by a 5 year warranty

Operating the product outside of the normal specifications will invalidate the warranty

PLEASE NOTE - Warranty of the controller is void if the warranty seals on the screw heads are broken or missing.

CE Compliance

This product has been tested and is in compliance with the following standards:

EN61000-6-3:2007 + A1:2011

EN61000-4-3:2002

EN61000-4-6:2009

EN61000-4-4:2004

EN61000-4-5:1995

EN61000-4-2:1995

2006/95/EC

ESG Switchable JB

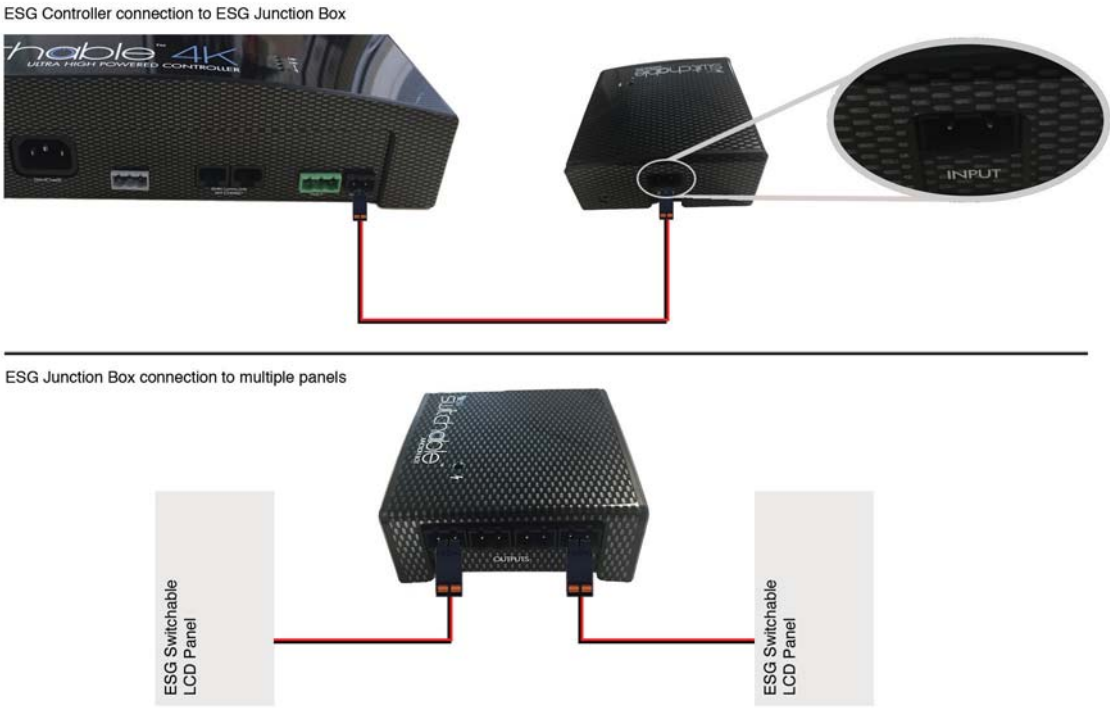
Junction Box

Description

For multi panel installations, ESG have developed the ESG Junction Box (ESG-JB). Designed to make installation as easy as possible by removing the need to wire multiple panels into the single LCD supply connector on the controller. The JB is connected into the LCD supply connector on the controller and then the individual panels are connected to the outputs of the JB.

Multiple Panel Installations using Junction Box

The ESG Junction Box can power have up to 8 panels connected as per the example below.



Multiple Junction Box Installations

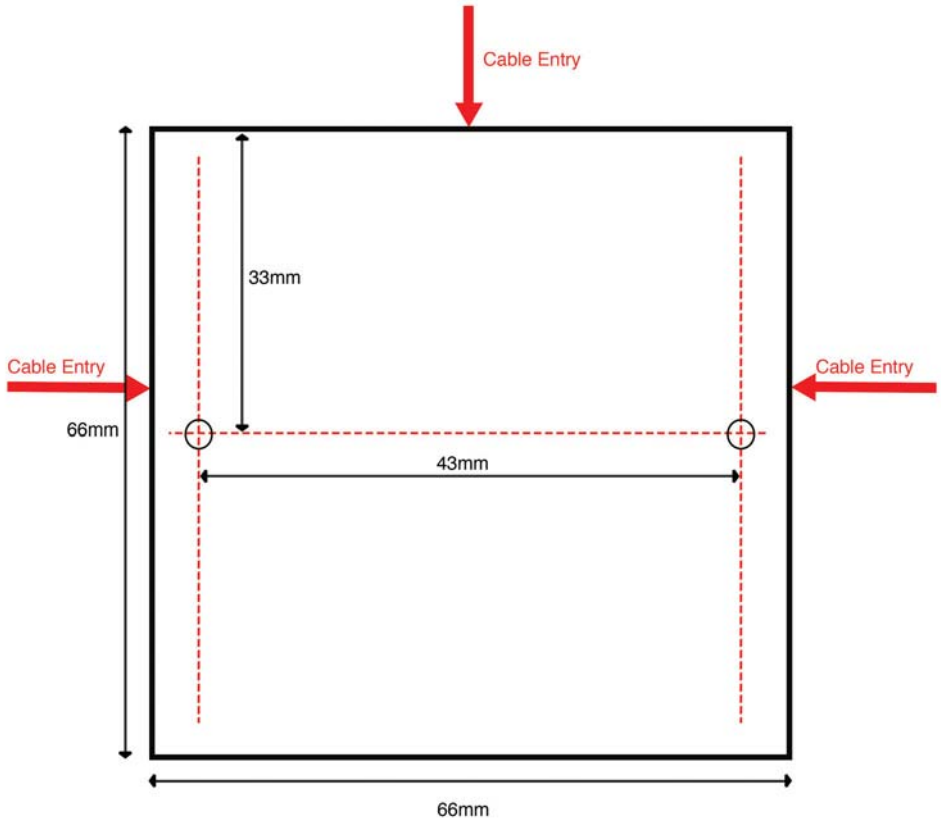
On limited occasions (most likely to involve installations using the ESG-4K), when the number of panels being controlled by one controller exceeds the 8 outputs of a junction box, it is possible to link two junction boxes together as per the example below.

e.g.

Mounting

The unit should be mounted either horizontally (base flat) or preferably vertically (as below). Vertical mounting on a wall for example is achieved by using two screws in the wall and sliding the unit's key slots over the screws.

Mounting layout



Screw head sizes must be larger than 5mm dia and smaller than 8mm dia.

ESG Switchable
Wireless Receiver

Description

Both the ESG-4K and the LCD HD-2 are able to be fitted with a wireless receiver to enable wireless controller control. we will need confirmation that you want to use wireless switching so that we can add the receiver during your controllers configuration. Asking for this option once the controller is installed could incur a cost for an engineers visit.

Technical Specifications

Reception frequency:	868.3 MHz
Intermediate frequency:	10.7 MHz
Sensitivity (finely tuned signal):	1 uV
Power Supply:	230V AC
Consumption:	0.5W

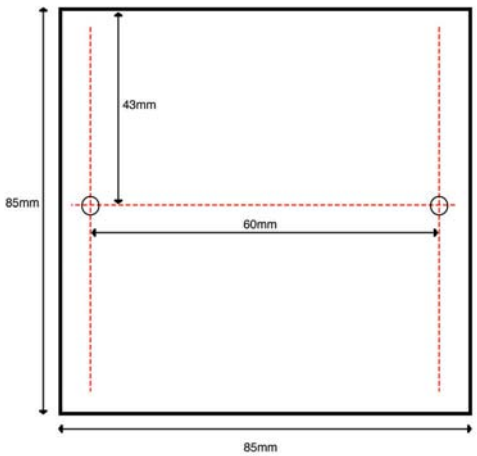
ESG Switchable Glass Controller
Wireless Switching

Description

It is possible to switch ESG Switchable using one of our wireless switches. These are paired to the internal receiver during the configuration process, additional switches must be paired at this time. A chargeable site visit will be needed to pair additional switches after installation. Range can be up to a tested 50m dependant on the building design.

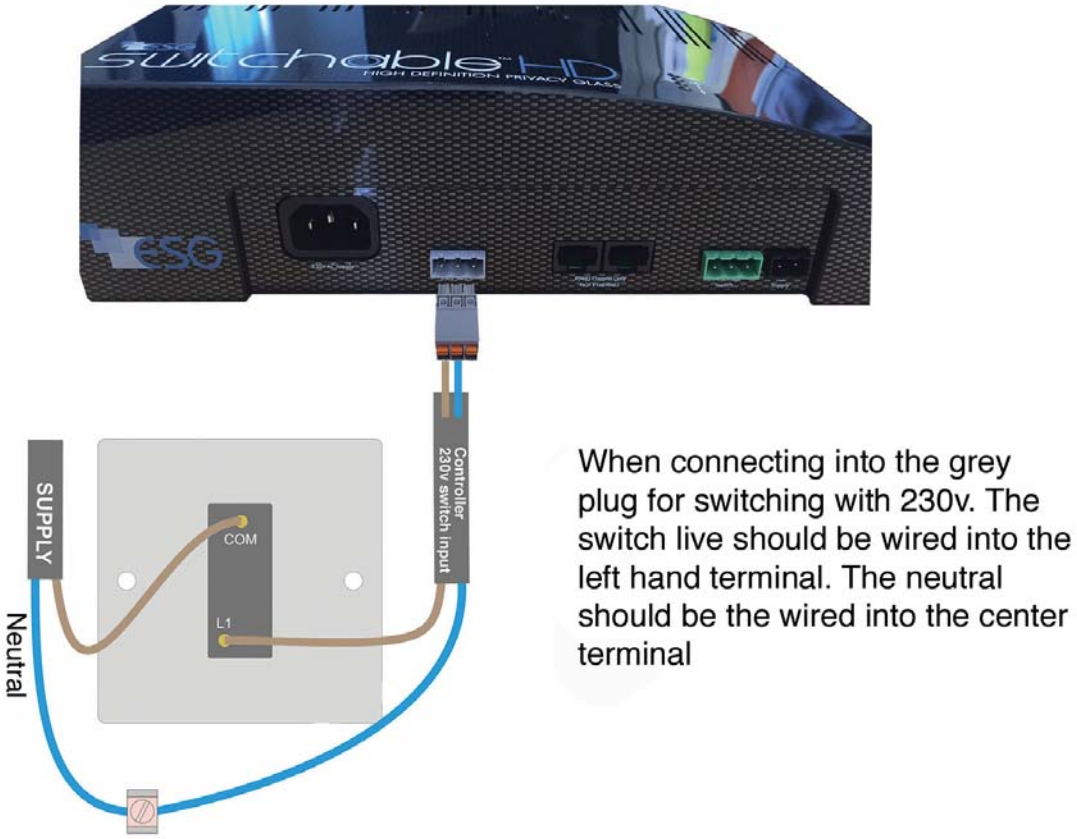
Mounting

Wall switches can be surface mounted using adhesive pad at the back of the switch or using the mounting holes on the back plate.



ESG Switchable Glass Controller

230v wall switching

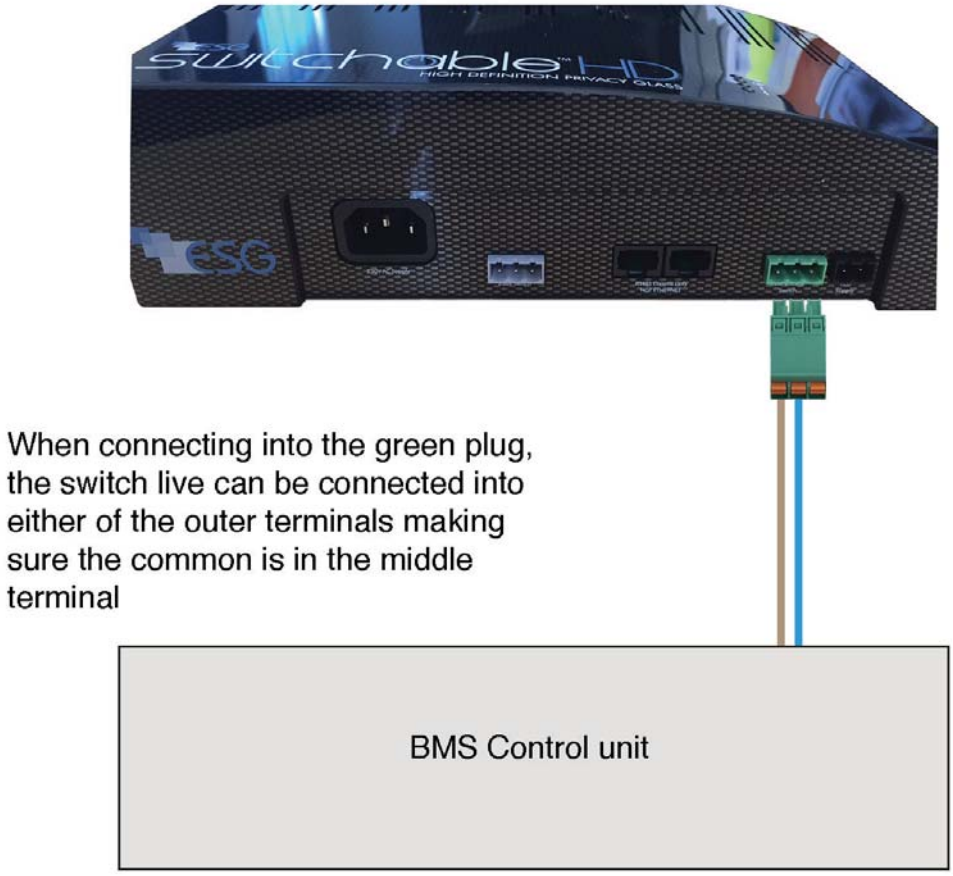


Description

Both the HD-2 and 4-K controllers can be switched using a conventional light switch and 230v switch live as per the illustration above. DO NOT wire this into the green switch socket

ESG Switchable Glass Controller

BMS switching



Description

Both ESG controllers are able to be easily integrated into all types of BMS system. Connecting the switching outputs from the BMS controller into the low voltage switch input enables the user to control the glass via the BMS user interface.

Frequently Asked Questions

The glass is not as clear as normal glass, is there a problem with the controller?

This is completely normal. The haziness is actually caused by the LCD crystals in the film. **No** LCD privacy glass is completely clear due to the inclusion of these crystals in the construction of the film. This haziness does increase when viewed at an angle, this is again a natural occurance in all LCD film due to its chemical make up.

What are the maximum sizes?

The maximum single panel size we offer is 1800x3500mm.

What shapes can the glass be made into?

ESG Switchable can be made in all shapes that standard glass can be processed.

Can ESG Switchable LCD be fitted into doors?

Yes, we currently have solutions for many sliding, pivot and standard hinged door sets.

Can i use ESG Switchable LCD as a projection screen?

An added benefit of the LCD film is that you are able to project onto it (from the rear only) allowing you to integrate with home or office AV.

How much does it cost to power the film?

Powering 4m² of glass for 20 hours a day will cost approx £24 a year.

The glass does not switch, is there a problem with the controller?

Both controllers in the range have been designed with diagnostic software that communicates to the user via a status LED on the lid of the box. If there is a problem the controller will indicate the type of problem via a series of flashes. This allows easy diagnosis of the problem and best way to resolve it.

All ESG Switchable LCD Panels MUST be switched off (opaque) for a minimum of 4 hours a day, otherwise warranty will be invalidated.

Appearance of Haze

Haze is an occurance in ALL PDLC products. Outlined below are a list of factors that may emphasise the appearance of haze in certain situations.

Visable haze is NOT a reason for rejection of the product and as such ESG will not accept any rejection claims. It is the responsibility of our customer to ensure the end user of the product is made aware of this before any orders are placed. Samples are available, however please bear in mind they may not accurately represent performance in all situations.

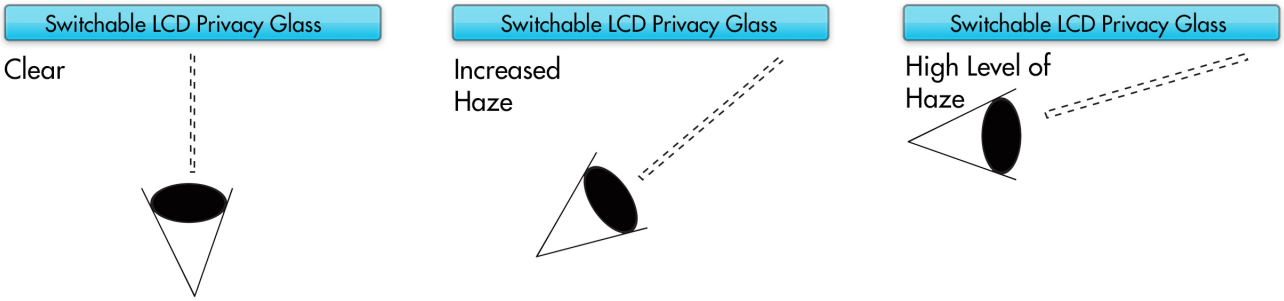
ESG Group use the highest quality film available on the market, meaning ESG Switchable has the lowest levels of haze possible. Due to the variable factors that effect the appearance of haze, it is not possible to compare haze levels between 2 installations.

Lighting.

Different lighting conditions can alter the amount of visible haze within the glass. Brighter light on the opposite side of the glass from which it is being viewed can cause a light imbalance which emphasises the haze. This includes direct sunlight if the LCD panel is being used on an external window.

Viewing Angle.

Industry guidelines state the clarity of the switchable LCD glass will be at its clearest when viewed at 90°. This is how clarity levels must be judged, NOT from any other angle. Viewing angles towards the glass do change the amount of visible haze, the greater the angle, the higher the expected levels of visible haze.



Position and Size.

Both of these have a bearing on the visible haze. A panel of 1m x 1m installed at eye line may appear to be clearer than a group of panels in a line and floor to ceiling height (e.g. 6m x 3m high). This is due to the differences in the angles that the glass is being viewed.

Due to the LCD film within the glass make up, Switchable LCD glass will never be as clear as standard glass. Please take this into account if the two types of glass are being installed next to each other.

Post Installation Accessibilty.

Please remember switchable glass is an electrical item and as such it can fail, although this is a rare occurance. Where ever possible please install the glass with this mind, so that if the glass needs to be replaced it can be easily removed and reinstalled. ESG provide a 5 year warrenty on the glass replacement only - our warrenty does not cover any associated costs in the removal and replacement of the glass such as labour and repair of surrounding fixtures and fittings which may need to be removed in order to access the glass.