



## Technical Guide for IG Smart Glass / Acrylic

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## 1. Shipping, Receiving and Storage

A full crating and shipping service is available for UK and worldwide export.

Where required, shipping crates are individually made for each customer order. These crates are robust and designed to provide protection of glass / acrylic, film and accessories in transit.

A small box is attached to the base of the crate containing electrical accessories purchased as part of the order.

It is the responsibility of the recipient to offload deliveries unless otherwise agreed prior to dispatch and correct handling methods should be observed when offloading.

It is the customer's responsibility to notify the shipper if access to the delivery address site is restricted.

If no preferred carrier is stated for shipping within the UK, consignments will be shipped through ground carriers, and overseas customers' consignments can be shipped via air, sea or road depending on location, cost and timescale required.

**Overseas customers are responsible for customs and clearance at the destination country.**

All consignments are sent Freight Collect and insured to the full value of the goods, a quotation for crating, shipping and insurance will be provided prior to dispatch.

### Receiving

Before signing for and accepting the shipment from the carrier, the crates should be inspected for shortages or damage. If shortages or damage is found the shipping documentation should so be noted and the driver's signature obtained as a witness.

ProDisplay should be notified of any short deliveries and/or damage to goods immediately or in any event within 24 hours of delivery in order to pursue a claim with the carrier.

**The Carrier or ProDisplay are not responsible for shortages or damage if the party taking delivery the goods fails to inspect the consignment at the time of delivery.**

### Un-crating

Smart Glass / acrylic panels are heavy and the crate should be placed on a level even surface prior to commencing un-crating.

**Warning: glass / acrylic panels are positioned vertically in crates, precautions should taken to prevent panels tipping forward prior to removal of the front panel.**

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Glass / acrylic often sustains edge damage between manufacturing and installation; therefore care should be taken when the product is being handled, in line with local recommended guidelines for the handling of glass / acrylic panels.

If the IG Smart Glass / acrylic is not being installed immediately after un-crating, care must be taken to protect the panels and store them in conditions where the relative humidity is less than 80% and a near constant temperature between -20 and +50 °C in order to prevent the formation of condensation on the glass / acrylic.

## 2. Installation

The customer or installer should thoroughly inspect each piece of IG Smart Glass / acrylic prior to installation.

Never attempt to install products which you consider to be incorrectly sized, damaged, scratched, abraded or deficient in any other way, in the first instance contact Intelligent Glass for an initial assessment.

Any attempt to install a deficient product will signify acceptance of its suitability and as such cannot not be replaced.

Adhere to all IG Smart Glass / acrylic installation guides. Never install IG Smart Glass / acrylic in pressure glazing systems that do not have a positive stop.

IG Smart Glass / acrylic should never be installed in situations where it may be subjected to loading or pressure or mechanical stress, for example installation into misaligned, damaged or warped framework or concentrated mechanical loads or actions.

We do not recommend the use of laminated smart glass / acrylic in frameless glass / acrylic door applications. Where laminated smart glass / acrylic is required for a door application a framing system which supports the glass / acrylic on 4 sides should be utilised.

Glazing to exterior and wet interior applications must be wet sealed in a suitable frame and impervious to moisture, with provision for the weeping of condensation that may form in the glazing system.

Electrical connections must be positioned and exit at the top of any installation in wet environment applications and must be completely sealed so as to be impervious to moisture ingress.

We only recommend the use of Dow Corning AS7096N, as a sealant, this can be supplied by Intelligent Glass.

Ensure all glazing gasket joints are cut and sealed in accordance with the relevant manufacturer's instructions to provide a watertight seal wherever joints are made.

All glass / acrylic pieces must be supported by two setting blocks. The blocks should have a Shore A Durometer hardness of 85 +/- 5 and be silicone compatible. The preferred location for setting blocks is at quarter points. The electrical connections should not be used to support the glass / acrylic.

Great care should be taken when installing fixings and fittings to the glass / acrylic, metal parts should never have direct contact with the surface of the glass / acrylic or the film and fittings attached by threaded fixings should be tightened to a maximum torque of 1Nm. (To avoid the risk of mechanical threaded fixing becoming loose over time the use of a high quality thread adhesive in line with the manufacturer's instructions should be considered)

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Unexplained Breakages can occur even after all precautions for glass / acrylic handling, storage and protection has been observed, this is beyond the control of the manufacturer and as such is not warrantable. Breakages of this nature can include but is not limited to:

- Thermal Stress
- Glazing System Pressures
- Accidental Damage during Installation
- Excessive Wind loading

### 3. Glazing

Prior to commencing installation examine all and make good any unsatisfactory conditions relating to the glazing system, stops, gaskets, channels, rebates which may impair the successful and safe installation of IG Smart Glass / acrylic or Film.

#### Internal Applications

Dry Glazing: this is the recommended interior glazing method.

Butt Joint Glazing: can be used in internal applications we recommend the use of Dow Corning AS7096N for “seamless glazing” effects, alternatively the use of clear dry plastic jointing trims may be placed between abutted glass / acrylic panels. (The use of polished edge glass / acrylic is recommended)

Wet Glazing: If a sealant is required use only Dow Corning AS7096N, which can be supplied upon request.

#### External Applications

Wet Glazing: Pre-shimmed Glazing tapes and Dow Corning AS7096N are required to create a seal impervious to moisture, with provision for the weeping of condensation that may form in the glazing system.

#### Framing Systems and Design

IG Smart Glass / acrylic is suitable for glazing to a wide range of steel, timber, aluminium and UPVC systems.

Frame edge clearance and face clearances may be used although a minimum bite edge of 10mm for IG Smart Single Glazing and Laminate Glazing and 16mm for Independent Glazed Units (IGUs)

Inadequate clearance for the edges can cause damage due to glass / acrylic-to-frame contact, a minimum edge clearance of 3mm is recommended to reduce this possibility.

Glass / acrylic larger than 0.6m<sup>2</sup> should be placed on four Shore A Durometer hardness of 85 +/- 5 and be silicone compatible. The preferred location for setting blocks is at quarter points.

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The blocks should be 1.5mm narrower than the channel width. Lock Strip Gasket Systems can also require setting blocks, refer to manufacturer for recommendations.

Customer specified holes and cut outs produced during the manufacturing process may cause the edge of the smart film to discolour slightly and as such will require 4-6mm coverage by a trim, escutcheon or bezel.

### Glass / acrylic Protection

ProDisplay cannot be held liable for damage caused by other parties. Once the glass / acrylic has been installed it is the responsibility of the installer, main contractor or building owner to provide protection and cleaning.

## 4. Electrical Installation

IG Smart Glass / acrylic is an electrical component and should be provided for in the electrical layout including the provision of fused spurs, switches, cable management and electrical connection boxes. All installations must meet the requirements of local regulations and guidelines and be carried out by a qualified electrician.

**Any metal framework close to or adjoining the wiring of the panel should be earthed.**

**IG Smart Film or glass / acrylic must NEVER be installed in direct contact with a metal frame**

**If in doubt consult a qualified electrician prior to commencing any installation work.**

Before installation commences bus bars, connection leads and cables should be inspected to ensure the integrity of insulation.

Where ever possible it is recommended that the operation of IG Smart Film or Glass / acrylic is tested prior to commencement of installation.

Great care should be taken to ensure that exposed bus bars, leads or cables do not come into contact with framework and any metal frames must be earthed and are totally sealed to prevent the ingress of moisture or water.

IG Smart Glass / acrylic operates at 110VAC, if the local mains voltage is higher than 110VAC a step down transformer is required. ProDisplay manufacture and supply a range of thermally protected isolating transformers.

Failure to use Pro Display Transformers may result in irreparable damage to the IG Smart Glass / acrylic or Film. (Datasheets can be supplied upon request). This is not covered by the warranty detailed in section 10 below.

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Multiple IG Smart Glass / acrylic panels can be connected in parallel to a single transformer up to the maximum M2 rating of each transformer:

50VA – 2 M2  
200VA – 10M2  
500VA – 25M2

An RCD with an MCB, or an RCBO should be used along with a fused spur at the connection point for IG Smart Glass / acrylic to provide local isolation.

Selecting the right one should be done in accordance with BS 7671:Requirements for Electrical Installations and will ensure that the device will not give unwanted tripping due to high inrush currents generated by the transformer(s).

It is imperative that the manual switch or remote control is wired into the circuit on the mains voltage side of the transformer; failure to observe this requirement may lead to irreparable damage of the IG Smart Glass / acrylic panels.

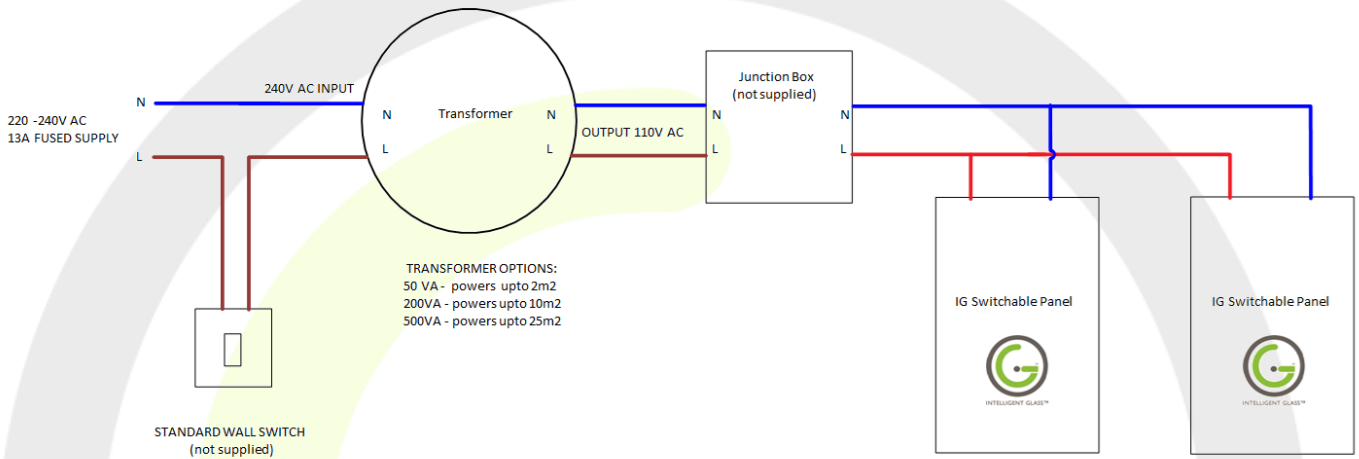
Before turning on the power to a new installation the electrician must test the resistance reading between the frame and the bus bar feed cables to ensure that the reading resistance is infinite. If this is not the case the short circuit should be found and insulated accordingly.

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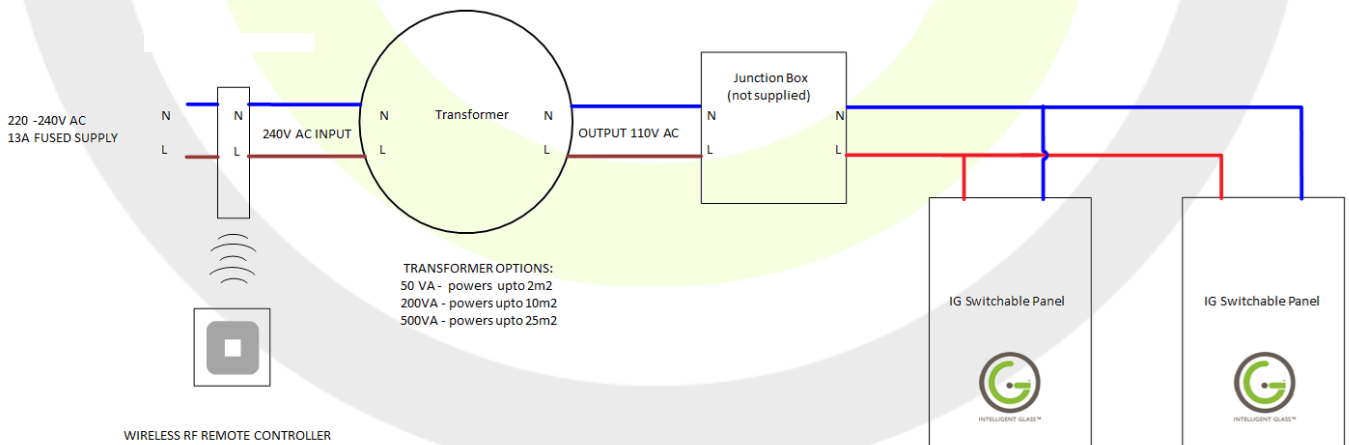
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## 5. Wiring Diagrams

IG Switchable Glass & Film **Standard** Wiring Diagram



IG Switchable Glass & Film **Wireless** Wiring Diagram



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## 6. Transformer Datasheets

### 6VA Isolating Transformer

**Electrical:-**

Impute. 230v ~ AV 50/60Hz. Full Load Current 0.045A  
Output. 110v ~ AC at 0.054A  
Max Power rating. 6VA  
Off Load Voltage. 138v  
Thermal Protection Self. Resettable thermal fuse 120 deg C

Manufactured and tested in accordance with the relevant sections of EN61558

**Connections:-**

Input Black 0.75mm 2 Core Cable 0.9mts Long

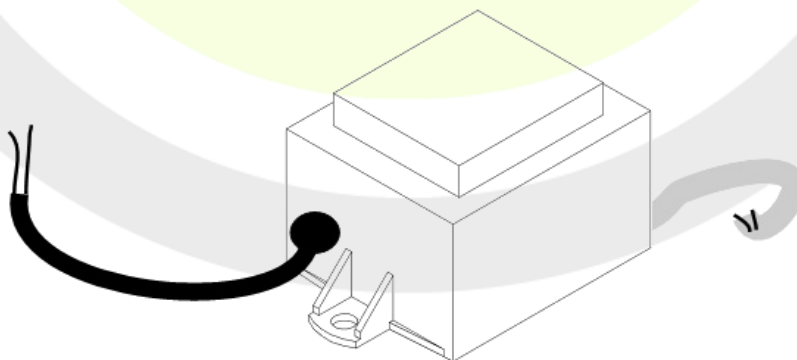
Output White 0.75mm 2 Core Cable 0.9mts Long

**Construction:-**

Moulded Plastic Box with 2 mounting Feet  
Fully Encapsulated  
Input / Output at opposite ends

**Dimensions:-**

Width 45.3mm  
Length 54.3mm  
Length Including Fixing feet 74mm  
Height 43.1mm  
Fixing Centres 65mm Hole Size 4.2mm Dia



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## 50VA Isolating Transformer

### Electrical:-

Input. 230V ~ AC 50/60Hz. Full Load Current 0.3A

Output. 110v ~ AC at 0.45A

Max Power rating. 50VA

Off Load Voltage. 120.8v

Thermal Protection Self. Resettable thermal fuse 120 deg C

Manufactured and tested in accordance with the relevant sections of EN61558

### Connections:-

Input Black 0.75mm 2 Core Cable 0.9mts Long

Output White 0.75 2 Core Cable 0.9mts Long

### Constructions:-

Black Moulded Plastic Box with 4 mounting Feet

Fully Encapsulated

Input / Output at opposite Ends

### Dimensions:-

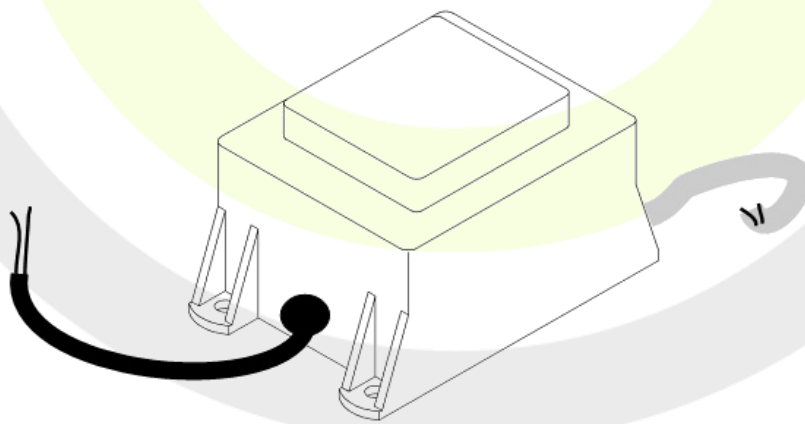
Width 69mm

Length 82mm

Length Including Fixing Feet 99.6mm

Height 68mm

Fixing Centres 90mm



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## 200VA Isolating Transformer

### Electrical:-

Input. 230v ~ AC 50/60Hz. Full Load Current 1.08A

Output. 110v ~ AC at 1.8A

Max Power rating. 200VA

Regulation 7%

Thermal Protection Self. Resettable thermal fuse 120 deg C

Manufactured and tested in accordance with the relevant sections of EN61558

### Connections:-

Input Terminal Block

Output Terminal Block

### Construction:-

Black Moulded Plastic Box with 4 mounting Feet

Fully Encapsulated

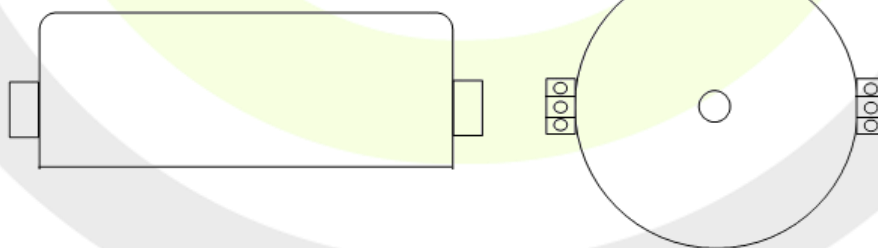
Input / Output at opposite Ends

### Dimensions:-

Diameter 125mm

Height 66mm

Mounting Hole Size 6.1mm Dia



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## 500VA Isolating Transformer

### Electrical:-

Input. 230v ~ AC 50/60Hz. Full Load Current 2.5A

Output. 110v ~ AC at 4.5A

Max Power rating. 500VA

Regulation 5%

Thermal Protection Self. Resettable thermal fuse 120 deg C

Manufactured and tested in accordance with the relevant sections of EN61558

### Connections:-

Input Black 0.75mm 2 Core Cable 0.9mts Long

Output White 0.75mm 2 Core Cable 0.9mts Long

### Construction:-

Black Moulded Plastic Box with 4 mounting Feet

Fully Encapsulated

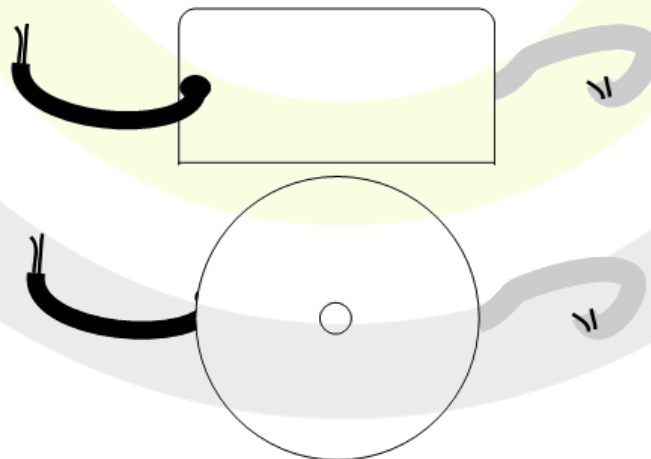
Input / Output at opposite Ends

### Dimensions:-

Diameter 152mm

Height 83mm

Mounting Hole Size 8.2mm Dia



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## 7. PDLC Datasheet

Item	Measuring Article		Test Condition	Unit	Value
Thickness	Film Thickness		Micrometre	mm	Standard Film 0.5mm +/- 10%
					Self-Adhesive Film 0.7mm +/- 10%
Optical Character	On	Transmittance	Spectro Photometer		78
		Haze			5
	Off	Transmittance			7
		Haze			78
UV Filtering	Self-Adhesive Film		Within 1 Year		99%
Dimensional Stability	Heat Shrinkage	MD	100°C x 30min	%	0.5
		TD			0.5

### Technical Specifications

ITO film – 350 microns  
 LC polymer coating – 100 microns  
 Protective coatings – 75 microns  
 Self-adhesive layer – 45 microns  
 Power – 110v  
 Frequency – 50-60 Hz  
 Electrical current – 0.1 amperes per square metre  
 Power consumption – 12 watts per square metre  
 Switching – less than 1 second  
 Operation mode – On (transparent) / Off (opaque)  
 Light transmittance – On (75%) / Off (67%)

### Test Procedures

Tested over 3 million switches  
 High temperature - >70°C (14 days)  
 High temperature / humidity ->50°C / 95% RH (14 days)  
 Cold temperature – minus 20°C (14 days)

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## 8. Cleaning and Aftercare

Once the glass / acrylic is installed, the glazing contractor should make provisions to ensure that glass / acrylic surfaces are protected from possible damage caused by the construction practices of other trades.

Special care must be taken during the initial cleaning, cleaning during the construction period, or when film surfaces are severely soiled, in order to prevent marking or damage caused by abrasive contaminants.

In the event that the film surfaces become heavily contaminated with abrasive particles the surface of the film should initially be blown with a low pressure compressed air or electrical blower to remove as much of the contaminant as possible.

Any remaining surface contamination should be removed by gently flicking the surface of the film with a soft bristled cleaning/dusting brush.

**Caution must be taken to ensure that any remaining abrasive materials do not become trapped and dragged across the film surface and the brush; otherwise the surfaces may be scratched.**

For routine cleaning, sparingly use a conventional glass / acrylic cleaning solution applied to lint free, clean, soft, grit free cloth.

Do not allow any metal or hard parts of the cleaning equipment to have direct contact the glass / acrylic surfaces.

Exposed IG Smart Film surfaces ( IG Standard Smart Glass / acrylic or IG Smart Film for Retrofit) should be cleaned initially with either a low pressure compressed air or electrical blower to remove any abrasive contaminants.

Only once this has been carried out should the film surface be cleaned with Soft IPA wipes and/or a PH neutral, non-abrasive liquid glass / acrylic cleaning product applied sparingly to a lint free, clean, soft, grit free cloth.

Do not allow any metal or hard parts of the cleaning equipment to contact the plastic surfaces.

**Please note that the plastic surface of the film can be marked or scratched if the care and cleaning instructions are not followed.**

**NEVER ATTEMPT TO CLEAN IG SMART GLASS / ACRYLIC OR SMART FILM WITH A WET CLOTH AND BUCKET OR OTHER WINDOW CLEANING TECHNIQUE WHICH DRENCHES THE SURFACE OF THE GLASS / ACRYLIC OR FILM. THIS WILL CAUSE IRREPARABLE DAMAGE TO THE PRODUCT AND WILL INVALIDATE THE WARRANTY**

To ensure many years of problem free operation we recommend that IG Smart film is operated continuously (switched clear) for no longer than 16 hours in any 24 hour period.

**Annual checks:** We recommend that the client should check that all wiring is in good condition, framing materials are free of any damage and that the transformer and switch are in good visible order. The areas adjoining the Smart Glass / acrylic including walls, ceilings and floors should be checked for structural integrity, excess humidity

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and temperature. Should any of these items appear unusual the client should immediately notify the original supplier / installer / contractor or Intelligent Glass.



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## 9. CE Declaration of Conformity



### DECLARATION OF CONFORMITY

**MANUFACTURER:** PRODISPLAY TM LIMITED  
**ADDRESS:** UNIT 5 SHORTWOOD BUISNESS PARK  
HOYLAND, BARNSELY, SOUTH  
YORKSHIRE ENGLAND, S74 9LH

**PRODUCT NAME:** SWITCHABLE GLASS / ACRYLIC/FILM

The product here with complies with the requirements of the Low Voltage Directive **2006/95/EC** and the EMC directive **2004/108/EC**

The CE marking has been affixed on the device according to article 10 of the EMC directive **2004/108/EC**.

**CONFORMS TO THE FOLLOWING STANDARDS:**

**SAFETY:** IEC 60950-1: 2005-f AI: 2012  
EN 60950-1: 2006 +A12: 2011

The technical file and other documentation are on file with PRODISPLAY TM LIMITED.

**PAUL BESWICK**  
MANAGING DIRECTOR

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## 10. Warranty

10. ProDisplay warrants that IG Smart Glass / acrylic and Self Adhesive Smart Film products should be free from defects, assuming normal use and correct installation for a period of 2 years from the date of invoice unless otherwise stated.

To activate the Warranty send clear digital images of each section switched off and on to [warranty@intelligentglass.co.uk](mailto:warranty@intelligentglass.co.uk) Please confirm: a) the date of installation and b) the name, address and telephone number of the installer.

**Your warranty will only be valid once we have received these images and your order has been paid in full.**

Defects include loss of switching where the electrical system and supply has been correctly installed and functioning correctly

10.1 All samples, drawings, descriptive matter, specifications and advertising issued by PRO DISPLAY and any descriptions or illustrations contained in PRO DISPLAY'S catalogues or brochures are issued or published for the sole purpose of giving an approximate idea of the Goods and/or Services described in them. They shall not form part of the Contract and this is not a sale by sample.

10.2 Subject to any additional warranty terms notified to the Buyer in writing in advance relating to the Goods and subject to 10.4 below, PRO DISPLAY warrants that:

(a) where applicable, the Goods will meet the Goods Specification in all material respects for the Warranty Period where the Goods are at all times stored, installed, used, maintained and handled in strict accordance with any and all written instructions provided or made available by PRO DISPLAY to the Buyer which relate to the usage, storage, maintenance or other handling of the Goods (the "**Instructions**"). PRO DISPLAY does not warrant or give any guarantees that the Goods will meet the Goods Specification where the Buyer does not strictly comply with the Instructions; and/or  
(b) where applicable, the Services will be performed using reasonable skill and care.

10.3 PRO DISPLAY does not warrant or give any guarantees that the Goods and/or Services will be fit for purpose and it shall be for the Buyer to determine that the Goods and/or Services, as applicable, are fit for the Buyer's purpose prior to placing an Order.

10.4 Subject to clause 10.5 below where the Goods do not comply with the warranty given at 10 above, PRO DISPLAY shall at PRO DISPLAY's option repair or replace such Goods (or the defective part) or refund the price paid by the Buyer for the relevant Goods provided:

(i) written notice of any defect in the Goods is given by the Buyer to PRO DISPLAY within 24 hours from the date of delivery of the same or, where the defect was not apparent on reasonable inspection of the Goods within 24 hours of discovery of the defect; and

(ii) notice of a defect is received by PRO DISPLAY within the relevant Warranty Period for the defective item of Goods ; and

(iii) the Goods have at all times been properly transported, stored, installed, handled, maintained and otherwise used in accordance with the Instructions prior to the discovery of the defect; and

(iv) the Goods have not been subject to any abnormal, improper or unauthorised use, modification or maintenance; and

(v) at PRO DISPLAY's request, the Buyer provides a brief report and digital photos of the Goods to assist PRO DISPLAY in determining the nature of the defect; and

(vi) at PRO DISPLAY's request, the Goods are returned to PRO DISPLAY at the Buyer's cost for inspection in its original packaging to such address as PRO DISPLAY may indicate. The Buyer must ensure all returned Goods are fully insured during transit.

The Buyer agrees that, subject to 10.7 below, this shall be PRO DISPLAY's sole liability in respect of a breach of the warranty given in condition 10.2(a) above; and PRO DISPLAY shall have no liability in respect of any defect which is not notified to PRO DISPLAY in accordance with this clause 10.4.

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10.5 PRO DISPLAY shall have no liability to the Buyer in respect of a defect in Goods if it occurs as a result of fair wear and tear; willful damage; neglect; abnormal working conditions; failure by the Buyer or any third party to comply with the Instructions; or misuse or alteration or repair of the Goods without PRO DISPLAY's prior express approval.

10.6 Any request to return Goods must be made to PRO DISPLAY in writing, which may in its sole discretion allow or refuse it. If a request is allowed an authorisation notice shall be issued to the Buyer and a returns number issued. No Goods will be accepted for return without a valid authorisation notice. All items to be returned must be securely packed together with all documents and accessories in the original packaging and with the returns number clearly stated.

10.7 In the event that the Services do not comply with the warranty given at condition 10.2(b) above, provided the Buyer notifies PRO DISPLAY in writing within 7 days of the date of the breach, PRO DISPLAY shall at its option refund the price paid by the Buyer for the relevant Services or re-perform the defective Services (or relevant part thereof). The Buyer agrees this shall be PRO DISPLAY's sole liability in respect of a breach of condition 10.2(b).

To ensure the safe and proper operation of IG Smart Film it must be installed by a qualified electrician and should be delivered, handled, installed, protected, cleaned and used in compliance with all local legislation, regulations and codes of practice and in accordance with the requirements set out in the IG Smart Film Technical Guide.

ProDisplay TM Ltd is not responsible for the replacement or repair of products which are damaged as a result of, but not limited to: natural disasters, improper use, and incorrect installation, use of incorrect silicones or unauthorised parts.

Haze: IG Smart Glass / acrylic and Film products are not as optically clear as standard glass / acrylic. All PDLC smart glass / acrylic and film has some degree of haze and this is not a reason in itself for rejection.

Switching Time: Whilst the transition time from opaque to clear (on) is usually less than 1 second, the transition time from clear to full opacity (off) can vary depending upon ambient temperature, length of time the glass / acrylic has been switched clear and age of the product, such variability in transition is normal and not classed as a fault.

Glass / acrylic Quality: Glass / acrylic used in the makeup of IG Switchable Glass / acrylic products conforms to the Visual Quality Standard as described by the UK Glass / acrylic and Glazing Federation.

Film Quality: It must be noted that manufacturing process of the Smart Film means that the PET surfaces can be exposed to very minor surface scratching which is not covered by the warranty. There may also be very slight variations in the thickness of the liquid crystal over the surface area during the coating process; this is not classed as a fault.

Tolerances for Mirror Vision, Toughened, Laminated and DGU Smart Glass / acrylic Products: +/- 3mm

Tolerances for all Film, Foil and Interactive Products: +/- 1.5mm

UV Stability: IG Smart Glass / acrylic and Self-Adhesive Smart Film is warranted for a period of 1 year from purchase against discolouration or damage caused through UV exposure.

DGUs: The warranty for Switchable DGUs mounted in a timber frame is 12 months from installation date.

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