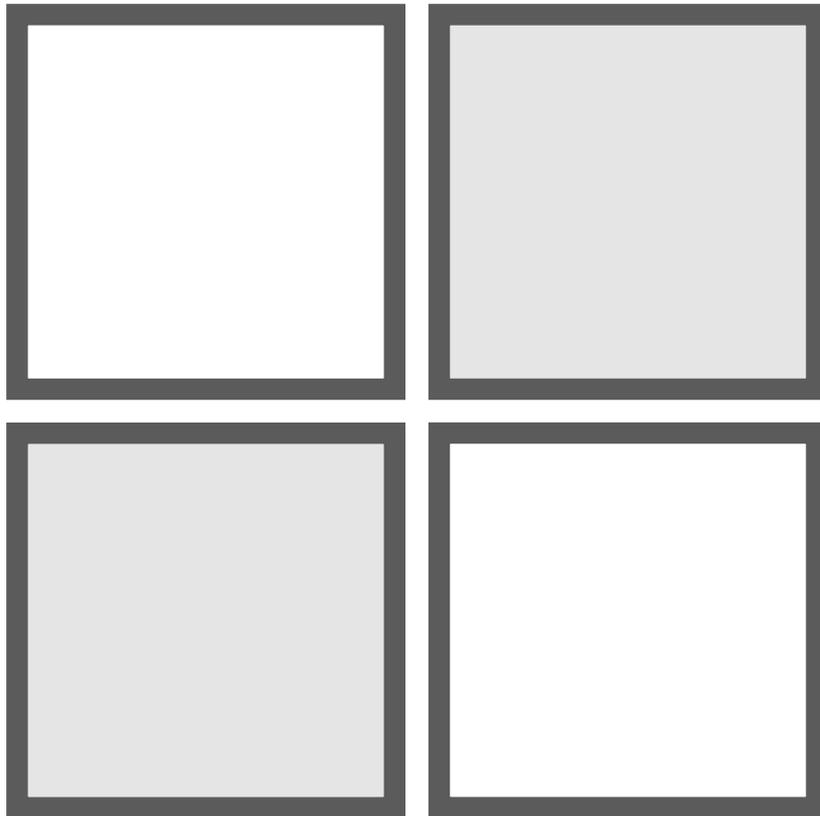




## Design and Installation Guide



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**In order to take full advantage of the unique characteristics, please carefully read this instruction manual before you start installation of Switchable Light Control Glass "UMU".**

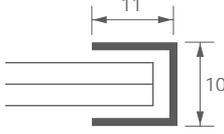
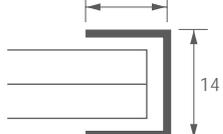
**Please note that when you install "UMU", it requires electrical work in addition to the ordinary glazing work.**

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<i>Standard Combination of Glass</i>	1
<i>Glass Processing</i>	1
<i>Protector Variations</i>	2
<i>Sash Configuration</i>	3
<i>Sash Fitting</i>	3
<i>Plastic Joint Bar</i>	4
<i>Electrical Wiring</i>	5

# Standard Combination of Glass

## PRODUCT LIST

	Clear float glass 3mm	Clear float glass 5mm	Clear float glass 6mm	Polished wired glass 6.8mm
Clear float glass 3mm	Thickness : 6.5mm LUMP6	_____	_____	_____
Clear float glass 5mm	_____	Thickness : 10.5mm LUMP10	_____	Thickness : 12.3mm LUMP5PWU
Clear float glass 6mm	_____	_____	Thickness : 12.5mm LUMP12	_____
Tinted glass 3mm	Thickness : 6.5mm LUMBZPP6	_____	_____	_____
Tinted glass 5mm	_____	Thickness : 10.5mm LUMBZPP10	_____	_____
Tinted glass 6mm	_____	_____	Thickness : 12.5mm LUMBZPP12	_____
Heat reflective glass 6mm	_____	_____	Thickness : 12.5mm LUMCP6P6	_____
High performance heat reflective glass 6mm	_____	_____	Thickness : 12.5mm LUMRSP6P6	_____
Combination	3mm+3mm	5mm+5mm	6mm+ 6mm , 5mm+ 6.8mm	
Dimensions of edge protector (mm)				

As for maximum sizes, please refer to page 2.

Note) A combination of two tinted glass sheets or two reflective glass sheets is not available.

## OPTICAL PROPERTIES

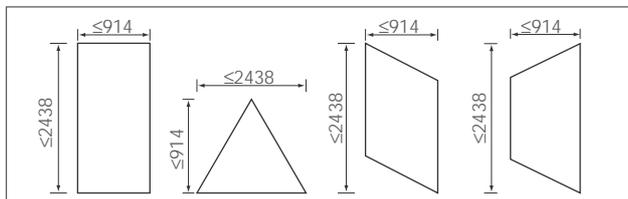
Visible light transmission	Clear state (ON) : 75%
	Translucent state(OFF) : 70%

## Glass Processing

In regard to shape, manufacture is possible under the conditions listed below.

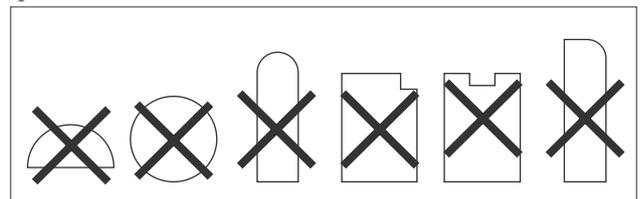
### Available

In addition to rectangles, shapes with no concave that consists of straight lines can be specially ordered and manufactured.



### Not Available

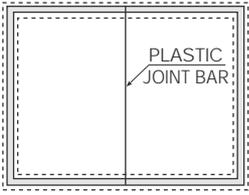
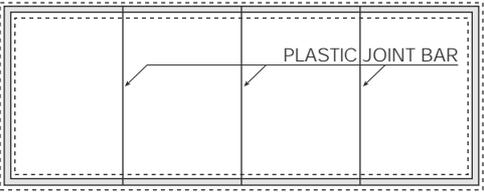
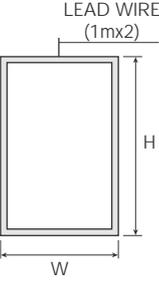
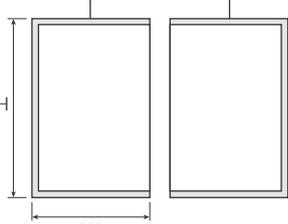
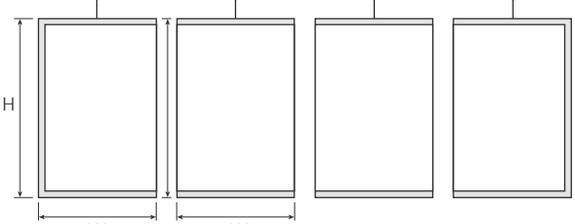
Shapes with a curved edge or a concave cannot be manufactured. Bent glass cannot be manufactured. Please consult us concerning other manufacturing questions.



# Protector Variations

Please choose one of the following glass configurations, according to your specific installation conditions.

## PROTECTOR VARIATIONS

	Single piece within one frame unit	Two pieces within one frame (interior use only)	Three or more pieces within one frame (interior use only)
Type of Glazing			
Design of edge protector	4 side protected 	3 side protected + 3 side protected  Screen cannot consist of 2 side protected only	(3 side protected x2) + 2 side protected  Screen cannot consist of 2 side protected only

Note) When placing an order, please specify either "interior use" or "exterior use". When the exposure to water or moisture is anticipated, please specify "exterior use" even in the inside of a building.

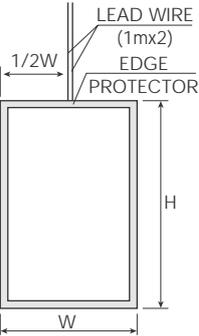
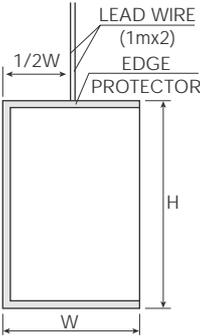
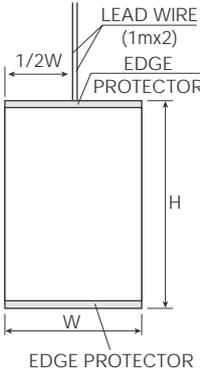
Acetic acid-type silicone caulking should absolutely not be used when installing UMU.

## Glass Configuration

The protector specifications are shown on the right. The ordered size should include the dimensions of edge protectors. When an edge is not protected, please measure to the end of the glass edge.

## Lead Wire

A lead wire of one meter long (standard) comes out from the center of the upper edge.

4 side protected	3 side protected	2 side protected
		
Interior and exterior use	Interior use only (free from exposure to water or moisture)	
Maximum size (mm) : H(W)2445xW(H)918	Maximum size (mm) : H2445xW916	Maximum size (mm) : H2445xW914

## Sash Configuration

Please select a sash configuration based on the type of UMU to be used.

### STANDARD DRAWING

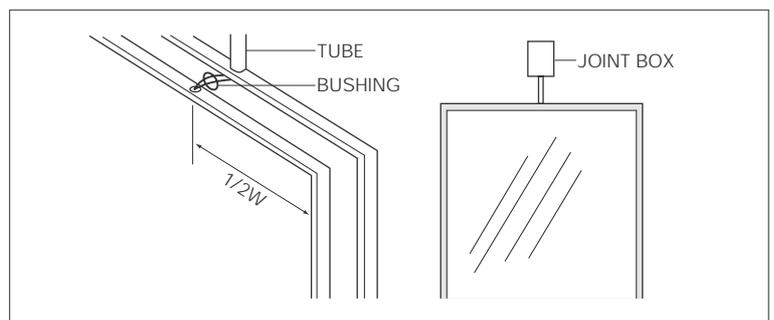
COMBINATION	3mm + 3mm	5mm + 5mm	6mm + 6mm , 5mm + 6.8mm
Standard dimensions(mm)			

## Sash Fitting

### Hole for Lead Wire

Open a hole in the sash trough for the lead wire to pass through.

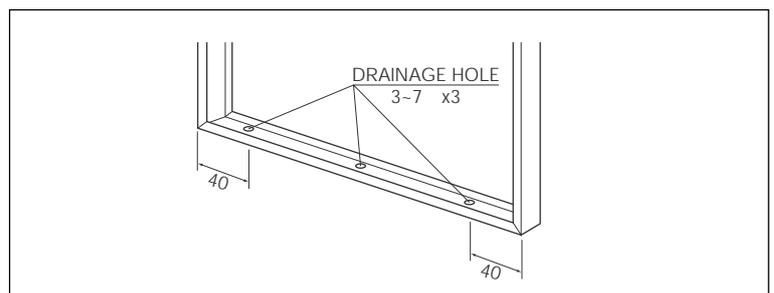
A short circuit will occur if the lead wire's covering is broken. Therefore, remove all spurs around the lead wire hole and be sure to insert a rubber bushing.



**Danger!** If you do not use a rubber bushing it may cause a short circuit.

### Hole for Drainage

In the case of external use, water drainage holes should be opened at 2 or 3 locations in the trough along the bottom edge of the glass.



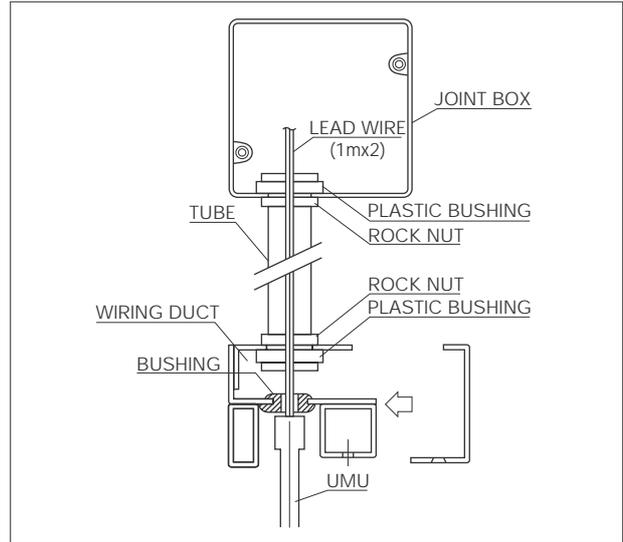
## Duct Sash

When using 2 or more sheets of UMU in one opening with electrical power supplied from one location, refer to this duct sash illustration for simple-to-perform wiring and easy replacement.

Please base your actual design on this reference drawing.

1. Even if the number of lead wires increases, installation is simple and can be completed in a short period of time.
2. By securing the passage, it avoids lead wire damage or short circuiting.
3. An inspection door makes maintenance simple.

## REFERENCE DRAWING



## Plastic Joint Bar

Specially designed plastic joint bars are supplied with UMU glass for jointing non-protected edges of UMU glass for the protection of liquid crystal.

Please refer to the installation manual delivered to you with this joint bar.

## Section Drawing

As shown right, a pair of convex and concave bars sandwich and fix the edges of two UMU glass. Three types of concave bars are supplied for different thickness of glass. One type of convex bar is used for every case. The bars are made of semi-transparent hard vinyl chloride resin. Please design all the joints to be 5mm wide ; 4mm for a joint bar and 1mm clearance.

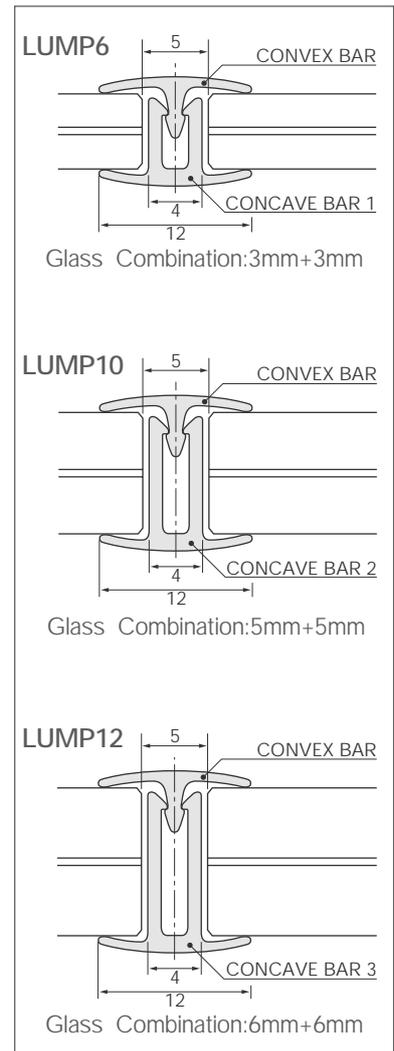
## Performance

Airtightness : Higher than CLASS 2 of JIS A1516.

Strength : Given a shock by a shot bag to the joint bar, no replacement of the joint bar was observed until the glass is broken.

## Installation Procedure

1. Temporally install all the UMU glass sheets to the opening.
  2. Adjust the width of every joint to be exactly 5mm.
  3. Fix UMU glass to the sash with back-up material.
  4. Cut joint bars with a fine saw into the height of opening. We recommend you to cut it 1mm longer than the exact height for neat work.
- Note)* For cutting a joint bar, scissors or a nipper is not recommended for avoiding a crack.
5. First, install a concave bar. Then, supporting the concave bar from the back, install a convex bar, and push and fix it from one end and proceed to the other.
- Note)* Never use a hard tool like a hammer for pushing the convex bar.
6. Adjust the joint bars and UMU glass sheets again so that each width to be 5mm.
  7. Confirm that all the joints are finished, install UMU unit to the sash.

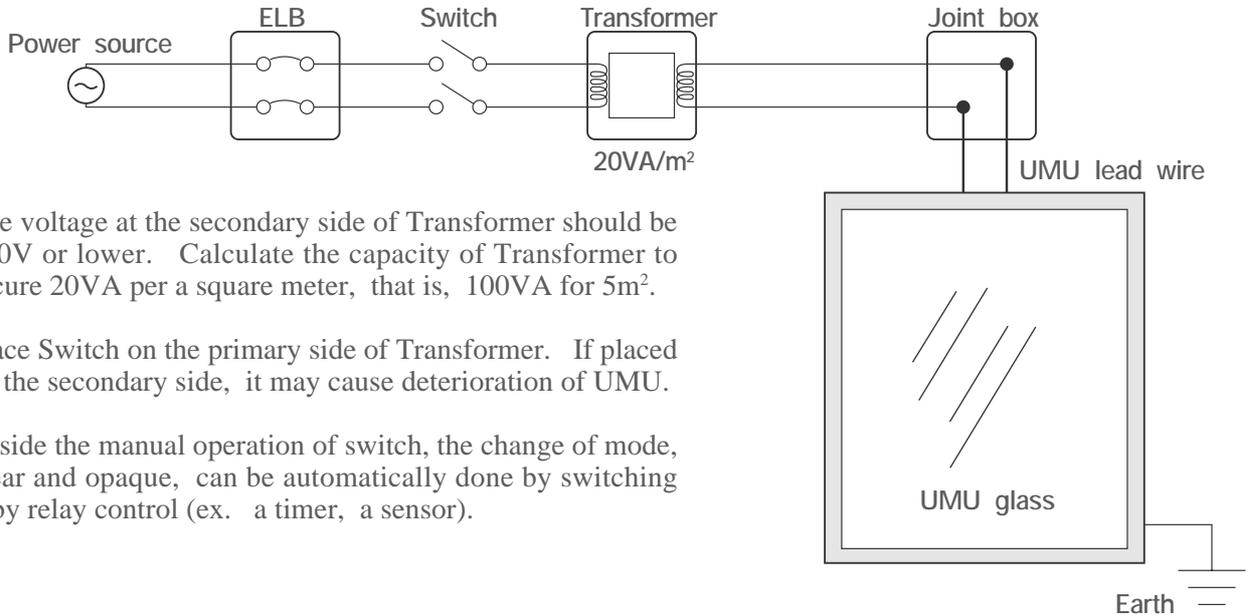


# Electrical Wiring

Note) Electrical wiring of UMU glass must be done by a qualified electrician.

UMU can only work with the electrical voltage between 80V to 100V. If the voltage of your electrical supply is higher than 100V, you have to adjust it with a transformer.

Please refer to the following electrical circuit diagram.



The voltage at the secondary side of Transformer should be 100V or lower. Calculate the capacity of Transformer to secure 20VA per a square meter, that is, 100VA for 5m<sup>2</sup>.

Place Switch on the primary side of Transformer. If placed on the secondary side, it may cause deterioration of UMU.

Beside the manual operation of switch, the change of mode, clear and opaque, can be automatically done by switching it by relay control (ex. a timer, a sensor).

For the independent operation of multiple UMU lights, please refer to the right upper diagram, and lower diagram for one unit control.

It is recommended to install Earth Leakage Circuit Breaker (ELB) especially when the exposure to water or moisture is anticipated such as exterior glazing or interior use near bath room or kitchen.

When the sash frames are made of metal (stainless steel, steel, aluminum, etc), be sure to ground sash frames.

