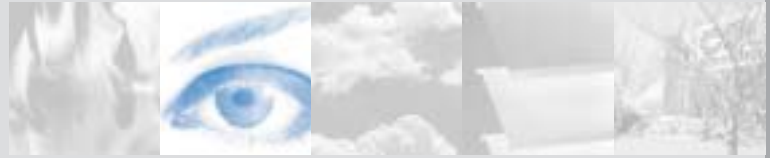




# Shadoglass

Glass Solar Shading System



- Smoke Control •
- Solar Shading** •
- Daylighting •
- Louvre •
- Air Handling •
- Climate Control •



# Introduction



## GENERAL DESCRIPTION

Colt Shadoglass systems are available in four discreet standard designs, and can be designed and configured to meet specific project requirements.

Shadoglass combines practical solar control and stunning aesthetics to offer designers a distinctive architectural product that is ideally suited to modern low energy buildings.

Glass panels are available in various colours, surface finishes and coatings to meet specific design requirements. Electricity-generating photovoltaic cells may be installed onto the louvres as an option.

## FEATURES & BENEFITS

Optimum performance of reducing solar heat gain whilst maintaining daylight levels.

Distinctive solar architecture product offering a wide freedom of design and striking aesthetic opportunities.

Four discreet product designs to accommodate applications from small windows to complete façades.

Glass comes in various configurations to meet performance and appearance specifications.

Three advanced control options are available, CCS 2000 for medium/large projects, Soltronic for smaller projects and the innovative Thermo-hydraulic system.

Durable and reliable with low maintenance needs.

## SOLAR SHADING

The importance of solar protection systems are being realised increasingly by architects today as demand to optimise internal climates, through energy efficient means, intensifies.

Solar heat gain and solar glare are a costly and unwanted hindrance for building owners. However, due to the introduction of Building Regulations Approved Document L2, designers must now reduce heat gain, with solar shading recommended as a preventative measure unless glass areas are minimised.

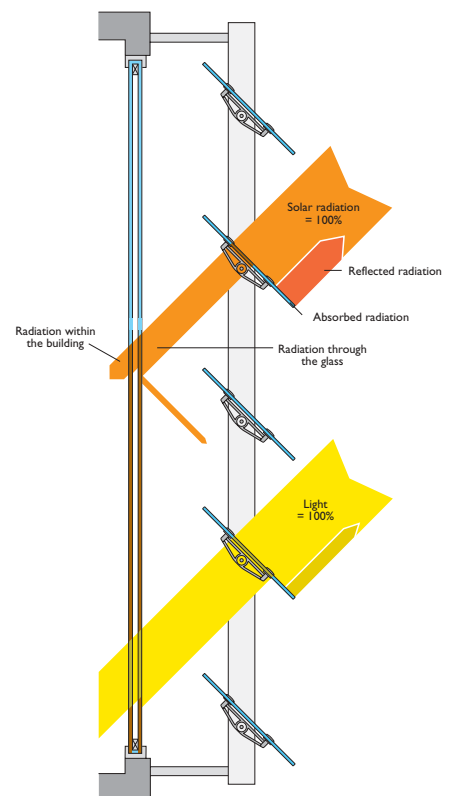
Shadoglass systems provide a distinctive solution to modern low energy building demands by maximising natural daylight whilst controlling solar heat gain and glare. Shadoglass also affords a view outside, ensuring that occupants remain connected to the external environment.

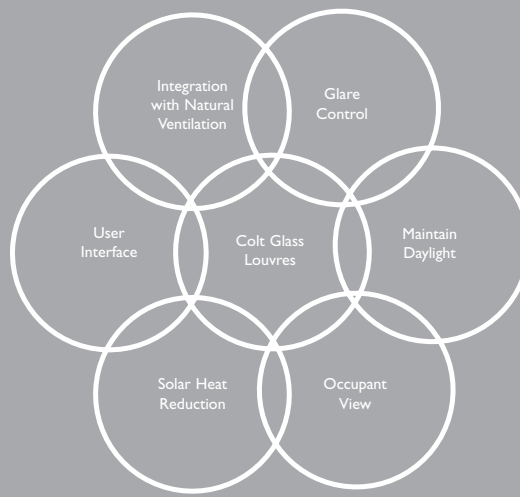
Shadoglass offers building designers the opportunity to create a striking architectural feature which is both aesthetic and functional.

## SOLAR RADIATION & GLASS LOUVRES

Radiation from the sun is partially absorbed and reflected by the glass louvres. As a result solar heat gain is prevented from passing into the building, minimising ventilation requirements or reducing cooling loads. In the summer months, the building is protected against overheating by adjustable reflective louvres that are controlled in accordance with the position of the sun. In the winter months, the passive solar energy contributes to the heating of the building.

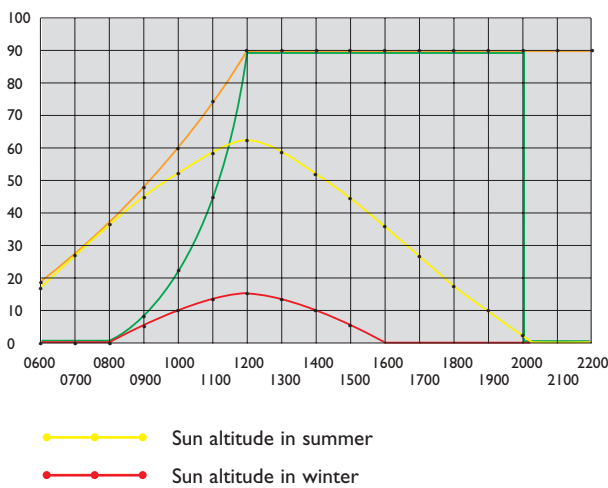
Additionally, daylight levels are enhanced whilst levels of glare are reduced.



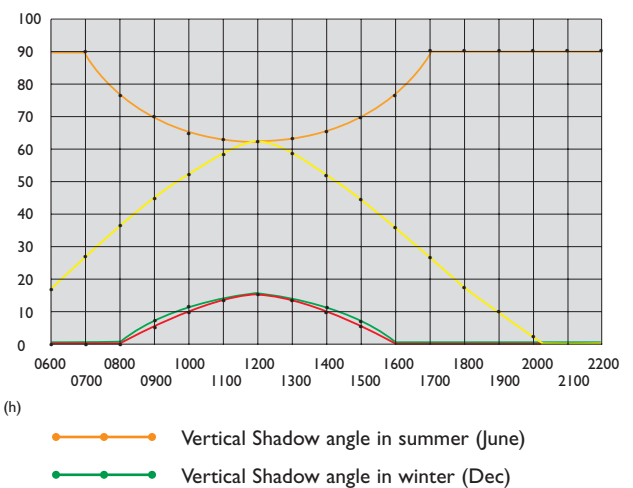


### SUN PATH

#### East façade



#### South façade



Notes: 1. When VSA  $\geq 90^\circ$  - façade is in the shade. 2. Normally the angle of the louvre follows the VSA. When shading is not required (i.e. when façade is in the shade or when the sky is overcast), the louvres may be set for maximum daylight entry or vision out, or closed for night security and improved insulation.

### TYPES OF GLASS

- Clear
- Tinted
- Fritted

### GLASS CHARACTERISTICS

The glass chosen for the louvres has a considerable effect on both the aesthetics and the solar shading performance of the system.

Most commonly used glasses are body tinted, fritted, or both, but any suitable safety glass may be specified.

Some typical examples of system performance are shown opposite, based on controllable shadoglass louvres in front of a low 'E' double clear glazing.

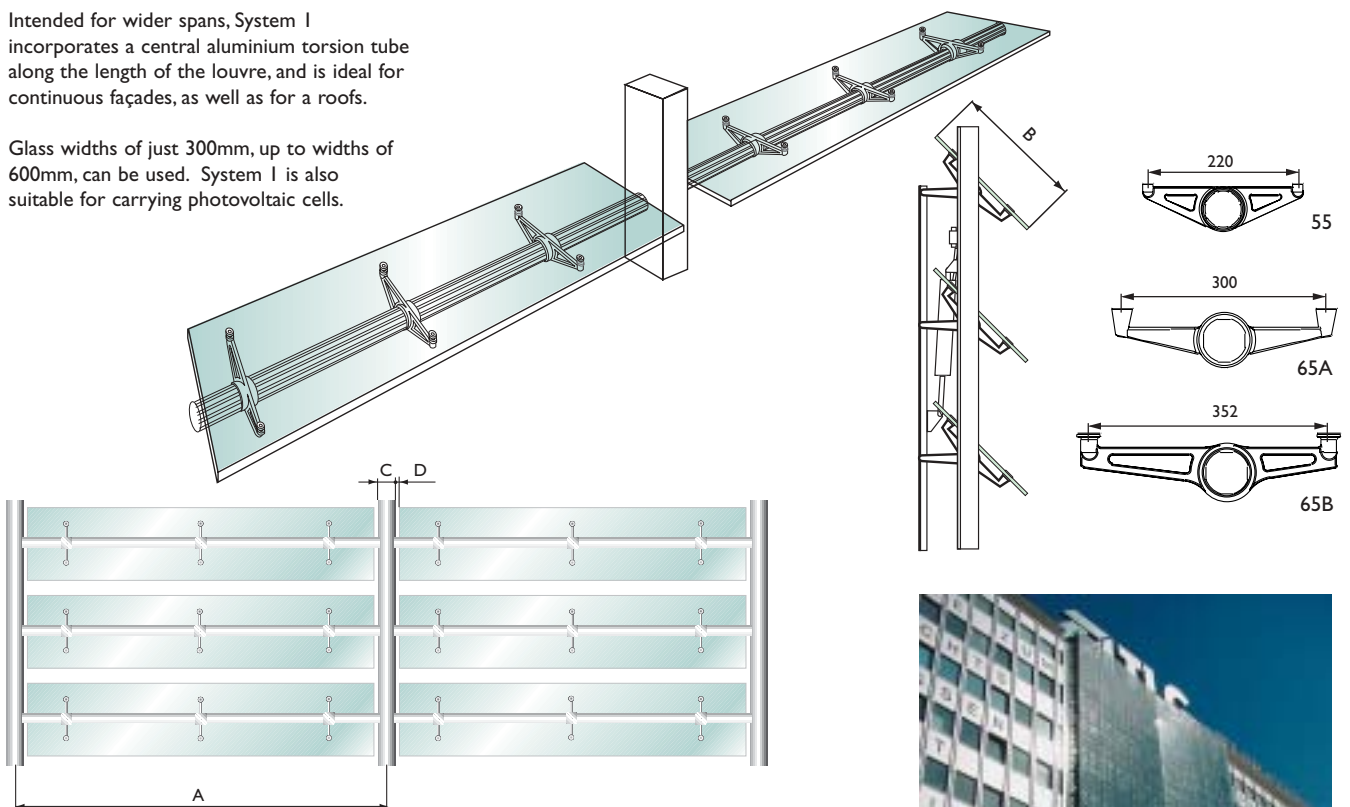
SHADING	TOTAL SOLAR TRANSMITTANCE (g value)	SHADING COEFFICIENT
None	0.68	0.79
10mm Clear Glass	0.56	0.64
10mm Green Tinted	0.30	0.34
10mm Green Tinted with 50% Frit	0.22	0.25
10mm Green Tinted with 100% Frit	0.16	0.18

# System I

## SHADOGLOSS SYSTEM I

Intended for wider spans, System I incorporates a central aluminium torsion tube along the length of the louvre, and is ideal for continuous façades, as well as for roofs.

Glass widths of just 300mm, up to widths of 600mm, can be used. System I is also suitable for carrying photovoltaic cells.



Dimensions	LSI - 55	LSI - 65A	LSI - 65B
A mm (max)	2500	3300	3300
B mm	350 - 500	350 - 500	420 - 600
C mm	60	60	60
D mm	10	10	10
Angle of rotation °	0 - 100	0 - 100	0 - 100
Torsion tube Ø mm	55	65	65





“We required a design to portray an image of openness and freedom. VAG, Auto-City”.

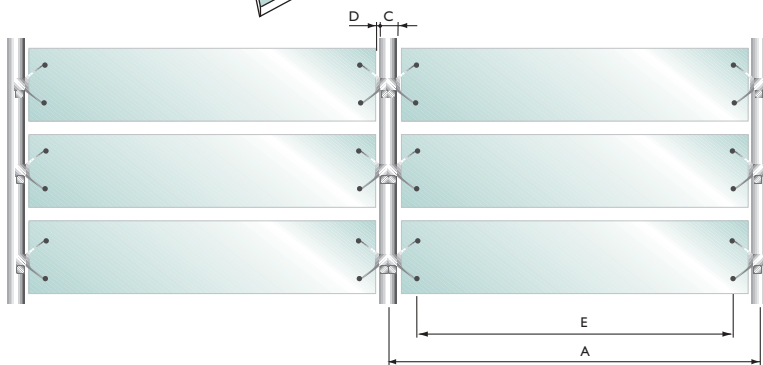
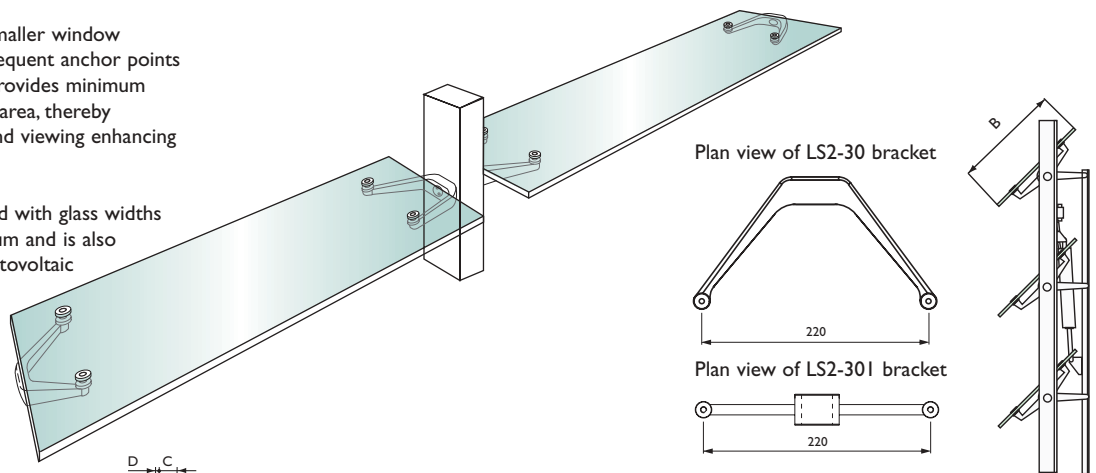


# System 2

## SHADOGLOSS SYSTEM 2

Primarily intended for smaller window applications or where frequent anchor points are available, System 2 provides minimum obstruction to the glass area, thereby maximising daylighting and viewing enhancing the view to the outside.

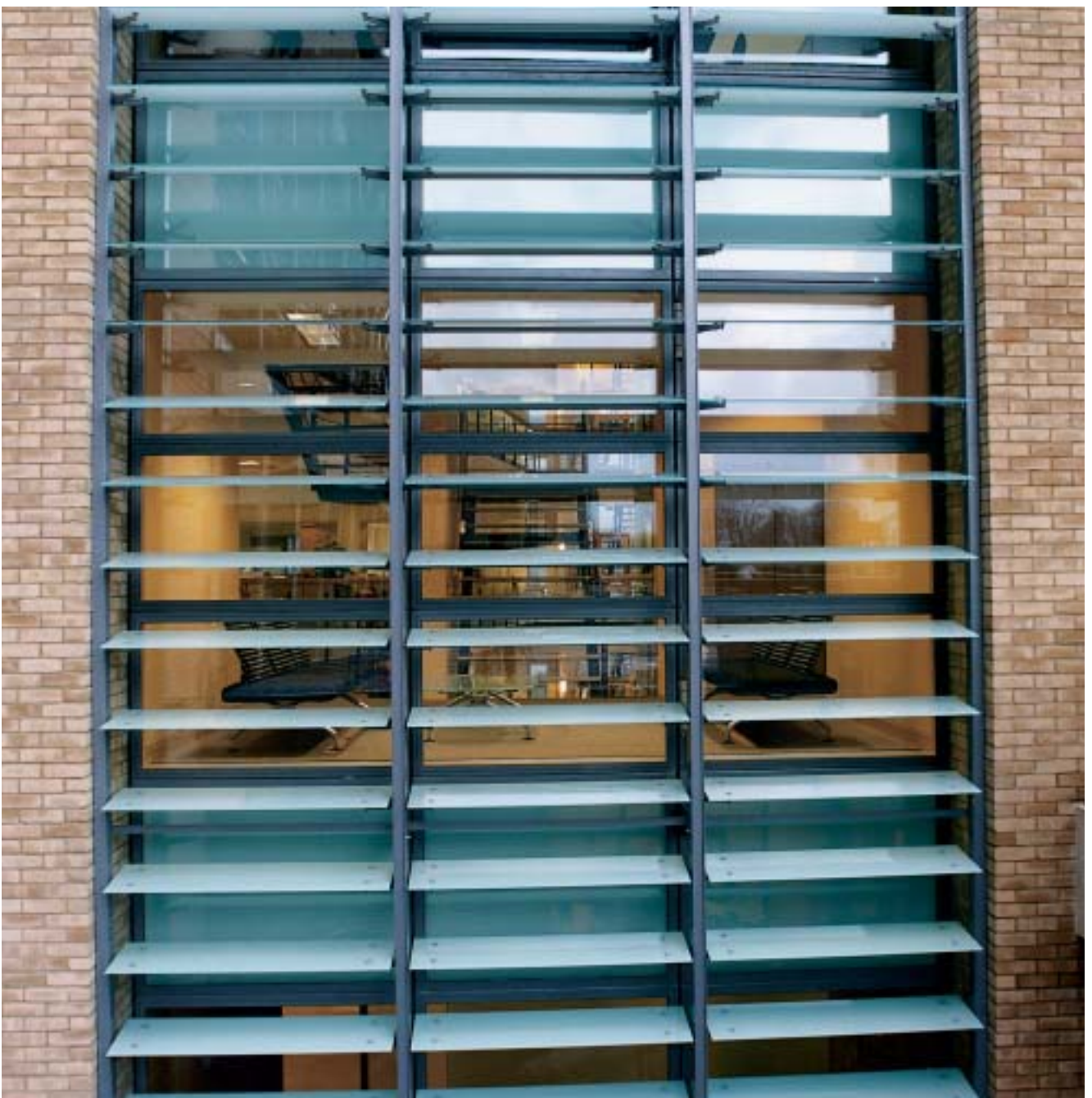
System 2 is manufactured with glass widths of up to 550mm maximum and is also suitable for carrying photovoltaic cells.



Dimensions	LS2-30	LS2-30I
A mm (max)	2000	2000
B mm	550	550
C mm	60	60
D mm	10	10
E mm	1700	1700
Angle of rotation °	0 - 100	0 - 100



“Shadoglass affords a view outside, ensuring that occupants remain connected to the external environment”.

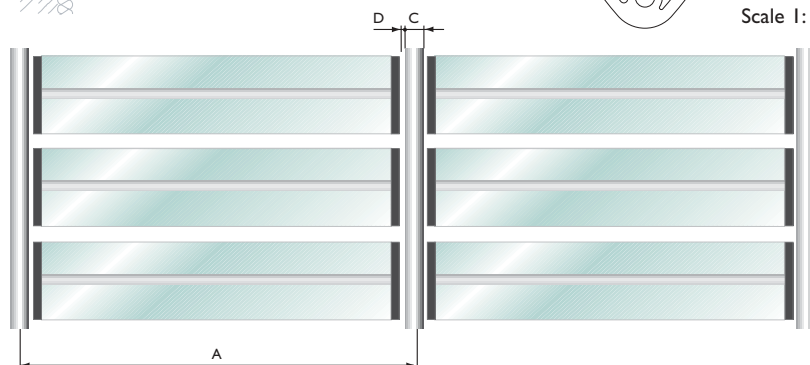
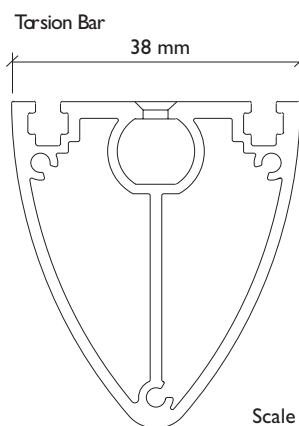
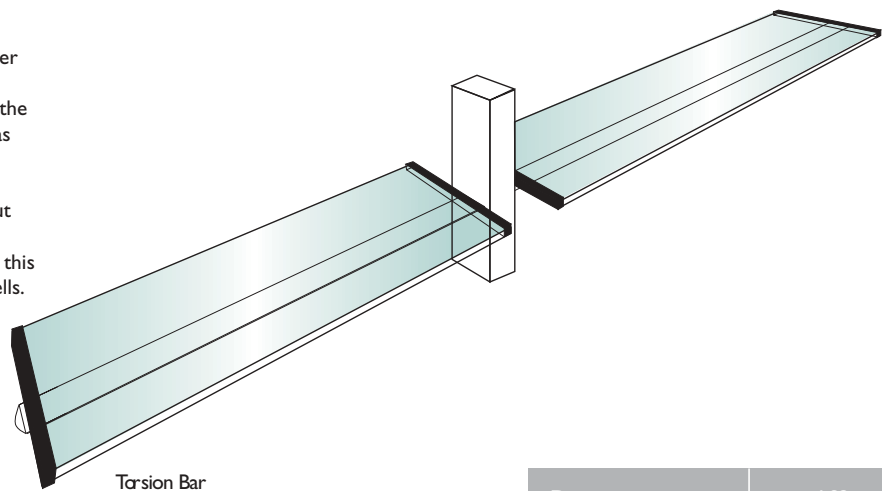
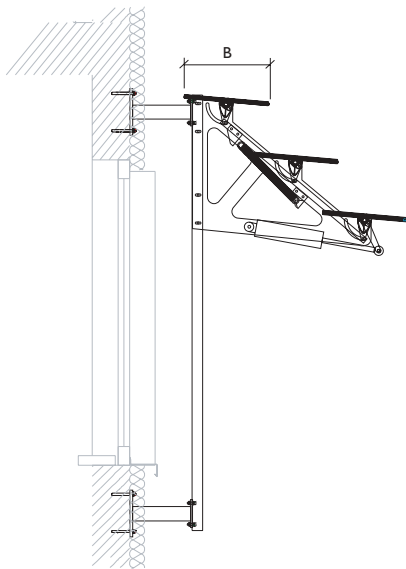


# System 3

## SHADOGLOSS SYSTEM 3

Like System 1, System 3 is intended for wider spans and incorporates a discreet central aluminium torsion tube along the length of the louvre, and is ideal for continuous façades, as well as for roofs.

Louvre spans of up to 4000mm long without additional support work can be achieved. 600mm wide louvres can also be used with this system and can incorporate photovoltaic cells.



Dimensions	LS3
A mm (max)	4000
B mm	600
C mm	60
D mm	5
Angle of rotation °	0 - 100





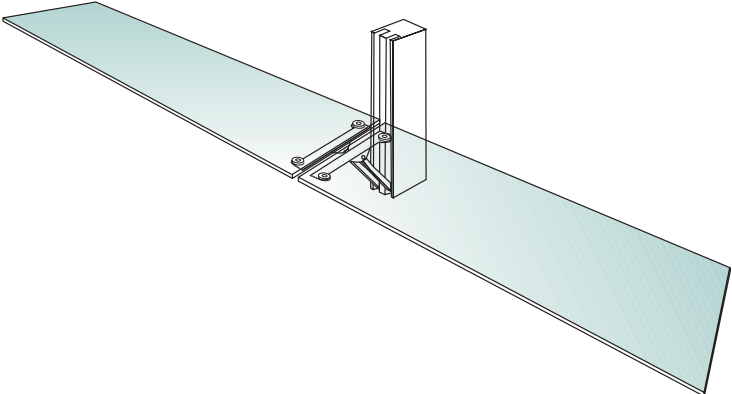
# System 4

“Eliminates ‘blinds down, lights on’ mentality”.

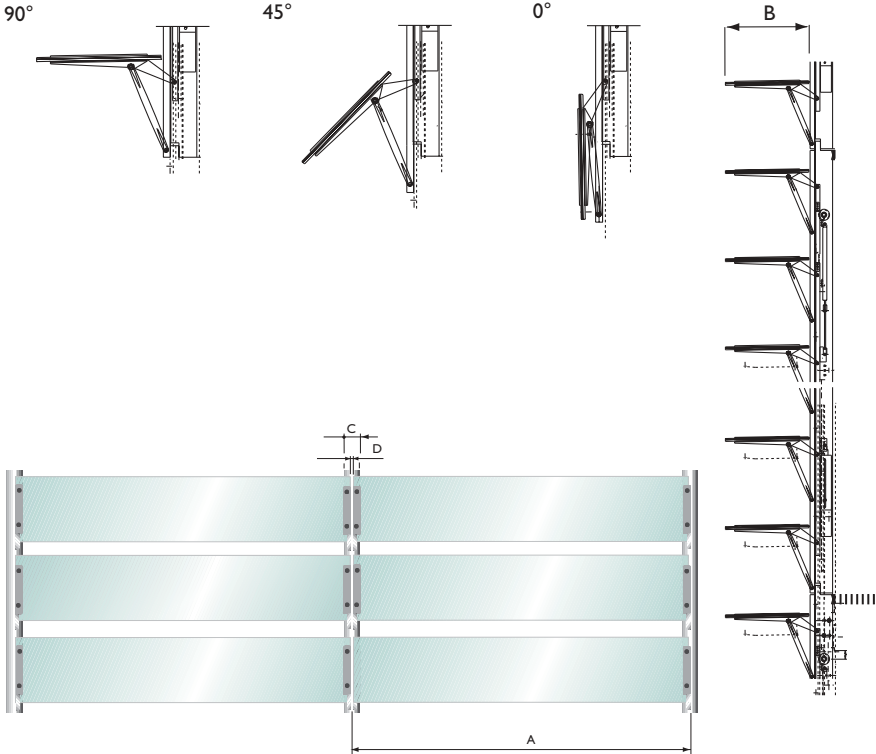
## SHADOGLOSS SYSTEM 4

Systems 1 to 3 are centre pivoted systems which require the supports to be connected to each side of the louvre. System 4 provides a back hung design solution with hidden control mechanisms integrated within the main vertical supports. This allows for seamless continuous louvres with unobtrusive supports when viewed from the outside looking in, due to the louvres being in front of the supports.

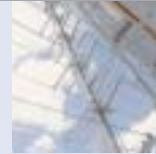
Suitable for smaller spans of up to 1800mm in length, System 4 can utilise louvre widths up to 600mm, incorporating photovoltaic cells if required.



Dimensions	LS4
A mm (max)	1800
B mm	600
C mm	55
D mm	10
Angle of rotation °	0 - 90



# Bespoke Glass Louvre Systems



## BESPOKE GLASS LOUVRE SYSTEMS

Specially designed in collaboration with you to meet your specific project requirements on larger projects.

### EXAMPLE 1 (left)

Colt has provided 3,400 m<sup>2</sup> of controllable tinted glass louvres for the Suva Insurance Company, which has constructed a striking new hospital in the Swiss Canton of Valais.

Of particular importance for the design, was that good views of the surrounding mountains would be maintained, whilst reducing summer heat gains.

### EXAMPLE 2 (below)

Designed by Renzo Piano, one of the landmarks of the new Potsdamer Platz in Berlin, is the 86 metre high corporate headquarters of Daimler-Benz Interservices, the most striking feature of which is an innovative glass louvre system designed and installed by Colt.





#### EXAMPLE 3 (right)

Waterhall Gallery, Birmingham.  
Curved laminated glass louvre with a white PVB interlayer (PVB laminated between two sheets of glass), which can be manually rotated for cleaning, was installed to maximise natural daylight entry to the main gallery.

Fixed to the South side only.



#### EXAMPLE 4 (below)

Würth Holding, Switzerland.  
Controllable vertical glass louvre is fitted to all four façades of this new office development in Switzerland. Its striking appearance ensures the building stands out from its surroundings, giving a unique, modern and functional exterior appearance.



# Shadovoltaic



Monocrystalline



Polycrystalline

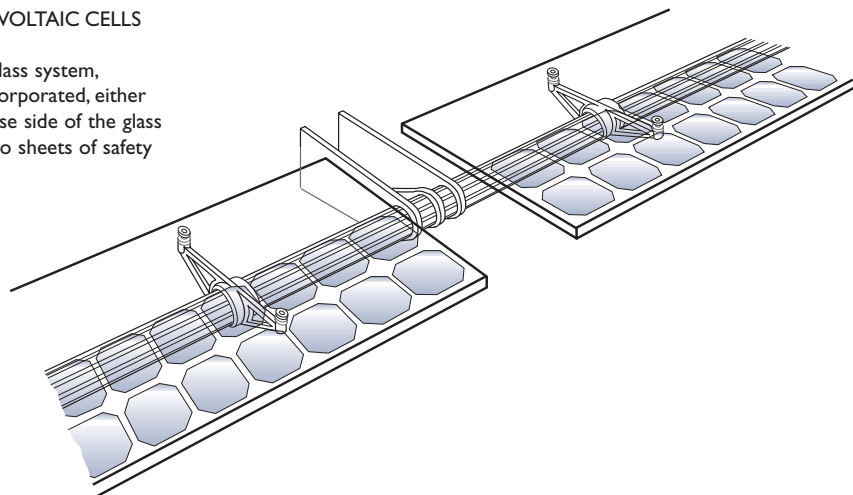


Semi-transparent

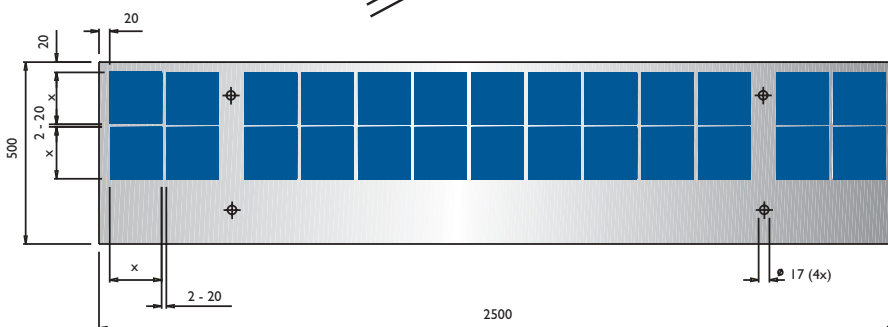
## SHADOVOLTAIC - PHOTOVOLTAIC CELLS

As an option for the Shadoglass system, photovoltaic cells can be incorporated, either by laminating onto the reverse side of the glass panel or set between the two sheets of safety glass.

Optional PV cell colours and patterns are available.



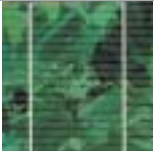
System I with photovoltaic cells.



Solar cell	Cell Efficiency	Surface Area per kWp Output *	Cell dimension x
Monocrystalline cells (Homogeneous structure)	14 - 16 %	7 m <sup>2</sup>	100, 125 mm
Polycrystalline cells (Heterogeneous structure)	12 - 14 %	8 m <sup>2</sup>	100, 125 mm
Semi-transparent cells	8 - 10 %	11 m <sup>2</sup>	100 mm
Various coloured cells	8 - 10 %	11 m <sup>2</sup>	100 mm

\* Based on 1000 W/m<sup>2</sup> Solar Radiation





Coloured



SBL Offices, Linz, Austria.

An area of some 250m<sup>2</sup> was covered with Colt Shadovoltaic louvres producing over 40% of the electricity required for the building.

At the same time not only has a comfortable internal working environment been achieved but the aesthetic appeal of the building has been dramatically enhanced.

THA - Thermo-hydraulics control the operation of the louvres which automatically track the path of the sun.

# Control Systems

## TOTAL CONTROL

Although fixed solar shading performs well on a South facing façade, performance is dramatically reduced on a East or West facing façade which still encompasses a large amount of sunshine during the day.

To overcome this problem, a controllable system is required. Sun tracking louvres follow the path of the sun, making sure the solar shading system is always optimised.

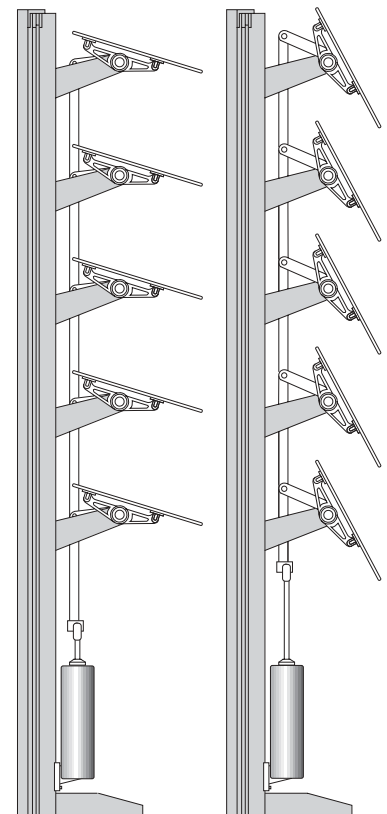
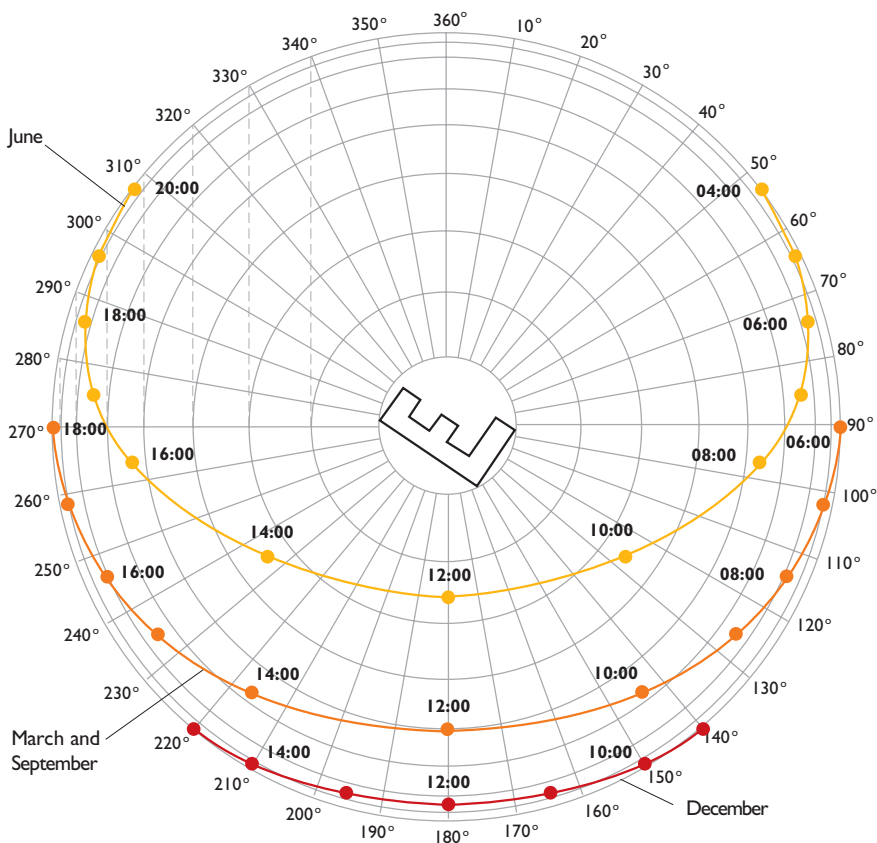
The control system can also be programmed to communicate with the louvres on dull or overcast days. If clouds pass over the building, the louvres will automatically open to maximise daylight entry and then revert back to the optimised position.

The Sun path diagram (below) for latitude 52° N, shows the position of the sun throughout the day during the months of June, March/September and December.

There are two control methods available for the Colt Shadoglass systems;

Electrically operated actuators, which require controllers such as the CCS 2000 or the Soltronic, or

Self powered hydraulics. These operate autonomously and required no additional controllers.





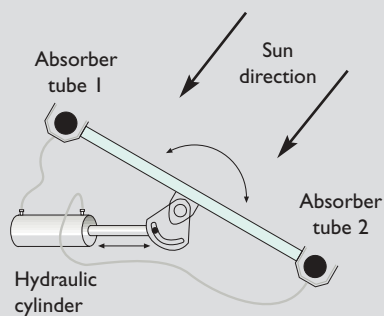
BRE Building 16, Garston, Watford.

Originally intended purely as a control for solar heat gain, however in an extension to the original concept, the system is also used to control glare, with the intention that occupants would feel no need to revert to a 'blinds down, lights on' mentality.

### THA - THERMO-HYDRAULIC

The THA is a thermo-hydraulic control system which is self-powered by the sun using the heat generated to expand or contract fluid within a tube.

This system requires no external power, absorber tubes, enclosed by mirrors, detect the position of the sun and force an hydraulic cylinder to open or close the louvres.



When absorber tube 1 gets hotter than tube 2, gases in the centre tube expand which hydraulically controls the cylinder rod, the louvre will rotate until both tubes are in equal alignment with the sun.



### SOLTRONIC

The Soltronic is a total new solar control system designed and manufactured by Colt, ideally suited for small to medium sized projects.

The microprocessor has been designed to respond to external weather conditions and automatically calculate the position of the sun, adjusting the position of the louvres accordingly.

The Soltronic is in effect, a simplified version of the CCS 2000 module and can control up to ten actuators in any single zone.



The Soltronic can be operated manually or from a building management system via a 0 - 10 voltage signal.

For example, 10 volts - louvres would open fully at 5 volts - louvres go to half way position, 0 volts - louvres close.

### CCS 2000

The CCS 2000 system provides accurate solar control and is ideally suited to larger projects.

The position of the sun is continually calculated by it's intelligent processor whilst internal temperature and lighting sensors send signals to the processor; altering the position of the louvres in conjunction with the present readings.

The CCS 2000 is very flexible with a variety of operating modes including, weekend programming, storm shut down and even a cleaning position.

Remote operation is available via an internal modem interface and manual override is also possible.



Colt CCS 2000 control module enables the building to 'react' to the changes in the weather and the sun's position to optimise the heat and light entry through the façade.

## COLT SERVICE

Part of the Colt Group of companies, Colt Service offers a comprehensive range of maintenance packages incorporating the maintenance and repair of all building services equipment including non Colt products.

Colt Service provide a 24 hour, 365 day emergency cover as standard.

## MAINTENANCE

Colt Shadoglass systems are designed to be virtually maintenance free, although regular cleaning of the glass panels with a mild detergent is recommended. For obvious reasons, abrasive cleaning agents and wire brushes must not be used. Periodic inspection of moving parts is also recommended.

