Solar Effects Projector Manual

contents

[OPTI]™ Kinetics

IMPORTANT SAFETY INSTRUCTIONS

When using your projection equipment, basic safety precautions should be followed, including the following:

1. Read and understand all instructions before using.
2. Close supervision is necessary when any appliance is used by, or near, children. Do not leave appliance unattended while in use.
3. Care must be taken, as burns can occur from touching hot parts.
4. Do not operate appliance with a damaged cord, or if the appliance has been dropped or damaged - until it has been examined by a qualified service person.
5. Position the cord so that it will not be tripped over, pulled, or come into contact with hot surfaces.
6. If an extension cord is necessary, a cord with a current rating at least equal to that of the appliance should be used. Cords rated for less amperage than the appliance may overheat.
7. Always unplug appliance from electrical outlet before cleaning and servicing and when not in use. Never yank cord to pull plug from outlet. Grasp plug and pull to disconnect.
8. Let appliance cool completely before packing. Loop cord loosely around appliance when storing.
9. To reduce risk of electric shock, do not immerse product in water or other liquids.
10. To reduce the risk of electric shock, do not dismantle this appliance, but take it to a qualified repairers when servicing is required. Incorrect reassembly can cause electric shock when the product is used subsequently.
11. The use of an accessory attachment not recommended by the manufacturer may cause a risk of fire, electric shock, or injury to persons.
12. Connect this appliance to a grounded outlet.
13. Disconnect this unit from its source of supply before replacing the projection lamp.
14. A safety chain or cable must be fitted to the projector and secured to an immovable object at all times. The securing point must be able to withstand the shock weight of the projector should it fall.
15. The axis across the width of the projector should remain horizontal if possible. Tilting the projector along this axis may reduce lamp life.
16. During focussing of the projected image beware of rotating the projection lens too far anti-clockwise, as this may cause the lens to become separated from the projector, and perhaps dropped and broken which may cause injury.
17. DO NOT attempt lamp replacement while the unit is still hot, there is a risk of burns from the lamp.
18. The procedures described in the Maintenance section must be carried out by qualified service personnel who should work under authority of the manufacturers recognised agent.
19. After any maintenance or cleaning all parts must be absolutely dry before refitting to the projector.
20. When replacing the cover of the projector always ensure that the wiring to the lamp and 12V~ sockets is correctly engaged within the slots in the cover and not trapped.

SAVE THESE INSTRUCTIONS

Do's and Do Not's

Do

1. Read instruction manual before installation or use.
2. Use a safety chain firmly attached to a mounting strong enough to withstand the shock should the projector fall.
3. Ensure that the mounting point will withstand its weight.
4. Refer electrical installation work to qualified personnel.
5. Ensure that all fastening devices are securely tightened before use.

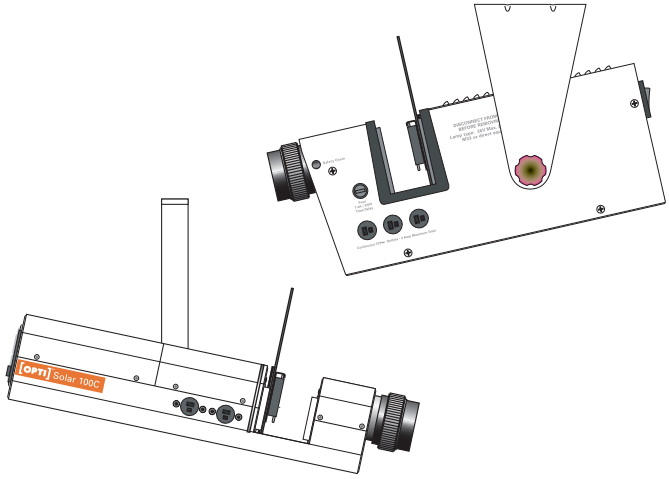
Do Not

1. Operate in wet conditions or allow liquid to enter.
2. Touch the lamp glass with bare hands.
3. Cover the air inlet grilles when projector is on.
4. Remove hatch or case when projector is hot.
5. Remove hatch or case when connected to mains.
6. Allow flammable materials within 500mm when hot.
7. Flash test the mains input.
8. Operate the lamp for more than the specifeid life.
9. Operate if the lamp is damaged or deformed.
11. Operate if heat filter or lens is scratched or damaged.

Mounting

There are 3 methods of mounting:

1. Suspended from above with it's hanging bracket firmly fixed to a strong beam or Trilite truss.

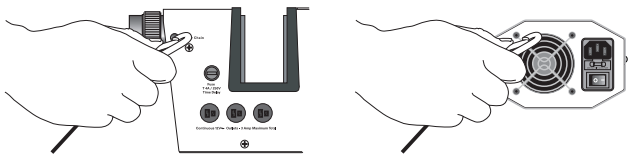


When hung from above, the projector must be securely attached to a mounting point, able to support its weight. All nuts, bolts and other fixings must be securely tightened, as well as the hanging bracket knobs and locking levers.

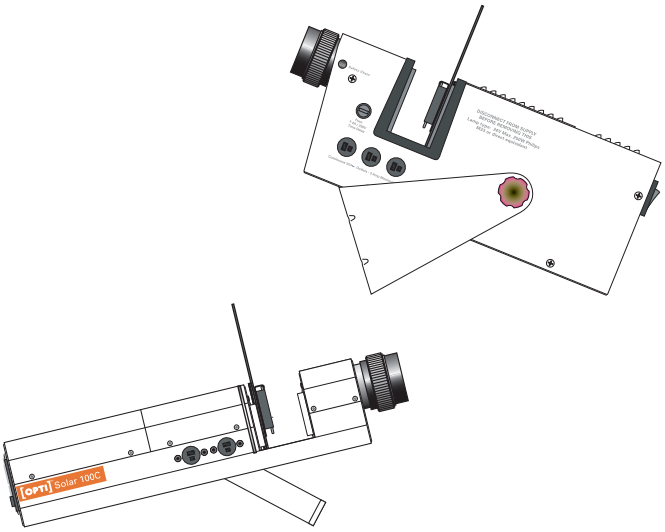
IMPORTANT
When hanging a safety chain or cable must be fitted to the projector and secured to an immovable object at all times. The securing point must be able to withstand the shock weight of the projector.

Fitting the safety chain or cable

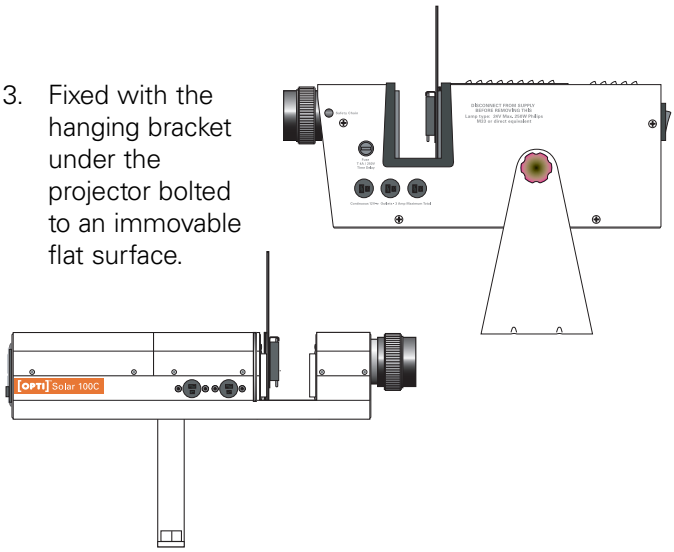
One end of the chain or cable is fitted to the eye hole on side of the Solar 250 projector* or the rear fab grill on the Solar 100C. The other end is securely fitted, as tight as possible to an immovable object.



2. Mounted on top of a flat surface by using the hanging bracket as an adjustable stand.



3. Fixed with the hanging bracket under the projector bolted to an immovable flat surface.



* The safety chain or cable may also be looped through the hanging bracket on the Solar 250 projector.

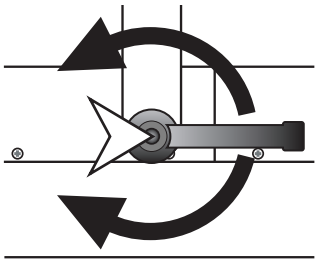
Adjusting the Hanging Bracket

Solar 250

1. Loosen central knobs on both sides and move the bracket/projector into desired position.
2. Tighten knobs securely.

Solar 100C

1. Loosen the securing lever and move the bracket/projector into desired position.
2. Tighten lever securely.
3. To adjust position of the lever press the central button pull away from the projector and turn to desired position. Then release.



Power

Solar 250

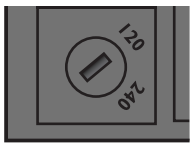
POWER RATING 350W MAX

The mains supply is supplied via the IEC mains inlet socket at the rear of the unit. An IEC power cable is supplied with each projector with plug fitted.

OPERATING VOLTAGES

220-240V~ 50-60Hz or **110-120V~ 50-60Hz**

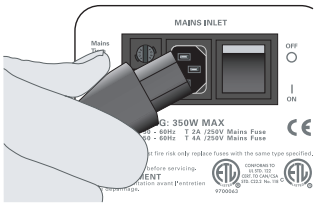
Before use check the voltage selector switch, on the back of the projector, is set to the same voltage as your local mains supply. If incorrect, move to the correct voltage position.



Voltage Selector Switch

Switching On

Simply plug in the IEC lead to the back of the projector and switch to the ON position.



Solar 250 Mains fuse

The mains fuse is fitted into the rear IEC panel. The mains fuse ratings are:

Mains Time Delay Fuse

220-240V~ 50-60Hz 20mm x 5mmØ T2A/250V
110-120V~ 50-60Hz 20mm x 5mmØ T4A/250V

Replace mains fuse

1. Unscrew retaining screw cap.
2. Remove old fuse and replace with new fuse.
3. Refit and tighten screw cap.

Solar 100C

POWER RATING 110W MAX

The mains supply is supplied via the IEC mains inlet socket at the rear of the unit. An IEC power cable is supplied with each projector with plug fitted.

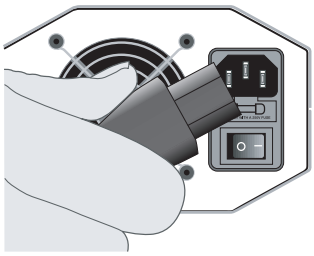
OPERATING VOLTAGES

220-240V~ 50-60Hz or **110-120V~ 50-60Hz**

The Solar 100C is factory set to the correct operating voltage of the Country where it is sold

Switching On

Simply plug in the IEC lead to the back of the projector and switch to the ON position.

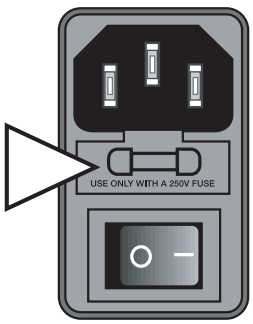


Solar 100C Mains fuse

The mains fuse is fitted into the rear IEC panel. The mains fuse ratings are:

220-240V~ 50-60Hz
20mm x 5mmØ T1.6A/250V

110-120V~ 50-60Hz
20mm x 5mmØ T3.15A/250V



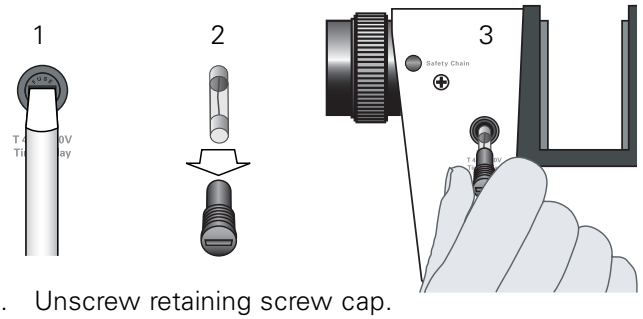
Replace mains fuse

1. Prise out fuse holder with flat ended screwdriver.
2. Remove old fuse and replace with new fuse.
3. Refit fuse holder and push in until flush with surface of the IEC panel.

Solar 250 12V~ fuse

The 12V~ outlets are protected by a 20mm x 5mmØ T4A/250V time delay fuse.

The 12V~ fuse is located on the side of the projector nest to the frot part of the gate and between the Safety Chain eye and the three 12V~ sockets.



1. Unscrew retaining screw cap.
2. Remove old fuse and replace with new fuse.
3. Refit and tighten screw cap.

Solar 100C 12V~ Auto Reset

The 12V~ outlets are protected by an internal Auto Reset fuse.

220-240V~ 50-60Hz 500mA MAX
110-120V~ 50-60Hz 1.1A MAX

The internal Auto Reset fuse is factory fitted and there is no need to replace. If it 'trips' power supply will be cut to the 12V~ sockets. Reset by switching off the projector, allow it to cool and then switch on again.

Plugging 12V~ Effect Accessory into the projector

Powered effects accessories need to be connected to one of the 12V~ sockets on the side of the unit. The Solar 250 has 3 two-pin sockets. The Solar 100C has 2 two-pin sockets on the opposite side to the Solar 250.

The two-pin plug from the powered effect accessory fits into any of the sockets.

Once power is applied and the projector is turned on the effect acessory will start to operate. In the case of an autochanger it will initialise and locate itself with position 1 in the field of illumination.

The Gate

The 'gate' of an OPTI Effects Projector is the area between lamp optics and the focussing lens into which the effect(s) to be projected are placed.

On both the Solar 250 and 100C the gate is a fixed opening and has two sides with runners on them into which 'effect accessories' which hold the effect(s) to be projected.

Rear The side closest to the lamp optics. The primary or main focal effect is fitted onto the appropriate effects accessory and this is then placed into the rear gate runners.

Front The side closest to the focussing lens. The secondary or image altering part of the effect, if required, is fitted onto the appropriate effects accessory and this is then placed into the front gate runners.

Effects

The range of effects available for the Solar 250 and 100C is split into three main groups. Effect Wheels, Effect Cassettes (50mm or 3") and Static Gobos.

There is a wide range of standard Wheels and Effect Cassettes available which are featured on our web site and in our Effects & Projection catalogue. In addition, if you require something bespoke we can produce custom effects in all sizes which also includes static gobos and slide transparencies.

Effects and Accessories

A range of OPTI Kinetics effects accessories are available for the Solar 250 and Solar 100C Effects Prpjectors.

Projection accessories are either: Gate (Gobo Holding) Accessories or Front of Lens Accessories. Gate Accessories hold the object(s) to be projected (see page 5 for more detailed description) and Front of Lens Accessories modify the image.

Single Gobo and Cassette Accessories

GOBO HOLDERS

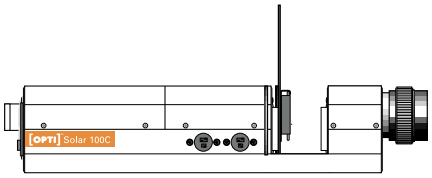
Slide/Gobo Holder	FG6033
Slide/Gobo Holder (+1/2 rpm Wheel Rotator)	FG6037

GOBO & CASSETTE ROTATORS

Slide/Gobo Rotator	FG6382
3" Effect Cassette Rotator	FG6320
50mm Effect Cassette Rotator	FG6391
3" Slide Cassette	FG6381
Cassette Safe	FG6326

Single Gobo Projection

If you simply want to project a single image either static or rotating, this is what you will need. For lens selection see page 9.



Projector + Lens

1 x Custom B/W 50mm Gobo

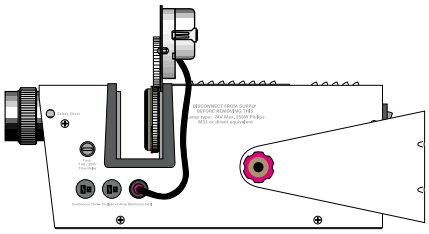
1 x 50mm Gobo Holder or (50mm Gobo Rotator*)

* If rotation of the projected image is desired.

Double Image Cassette Projection

The Double Image Cassette is unique to OPTI. There are two sizes both of which contain two gobos. One static, the other rotating. They can either create dynamic effects like those in our standard range or be used for promotions combining a static image and rotating message (or vice versa).

Shown below is what you would need for 50mØ Cassette projection. For lens selection see page 9.



Projector + Lens

1 x Double image 50mm Cassette

1 x 50mm Cassette Rotator*

* Rotates the outer image or text around or over a static image on the other glass gobo (as illustrated).

Customised double image cassette.

Standard effect cassette (No. 7111).

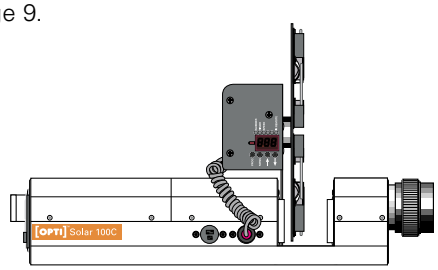
Multi Gobo and Cassette Accessories

AUTOCHANGERS

Six Static Slide/Gobo Autochanger	FG6384
Four Rotating Slide/Gobo Autochanger	FG6383
Four 50mm Cassette Autochanger	FG6386
Slide Blanking plate (only for Slide/Gobo Autochangers)	FG6038

Changing Gobo or Cassette Projection

If you want to project a number of interchanging static or rotating images this is what you will need. For lens selection see page 9.



Projector + Lens

6 x Custom 50mm Gobos

1 x Six Static Slide/Gobo Autochanger or

1 x Four Rotating Slide/Gobo Autochanger or

1 x Four 50mm Cassette Autochanger

IR REMOTE CONTROL

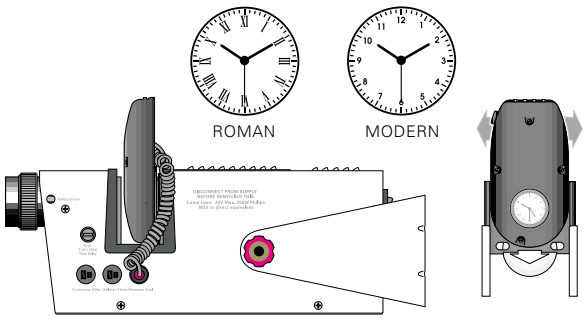
The IR Remote Control Handset can operate all OPTI Autochangers and the VSD 50 min - 5 rpm Wheel Rotators.

Infrared Remote Control Handset	GS9999

CLOCK ATTACHMENT

Modern Face	FG6010
Roman Face	FG6008
Custom Face (Price from)	FG6011

The OPTI Clock Attachment has moving hour, minute and second hands with a battery and real time clock ensure that accurate time is kept, for up to 10 years, when the projector is off. For lens selection see page 9.



Projector + Lens

1 x Standard B/W Clock

or:

1 x Custom B/W Clock*

Customised with your logo to reinforce your corporate identity.

Effects and Accessories

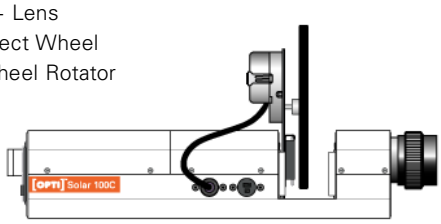
6" WHEEL ROTATORS

6 minute		FG6380
1/2 rpm		FG6340
5 rpm		FG6350
20 rpm		FG6360
VSD	50 min - 5 rpm	FG6378SM
Wheel Safe	1/2 rpm	FG0066
Wheel Safe	5 rpm	FG0064
Extension Shaft		GS6340E

6" Wheel Projection

If you want to project a 6" Effect Wheel this is what you will need. For lens selection see page 9.

Projector + Lens
1 x 6" Effect Wheel
1 x 6" Wheel Rotator



Gobos Combined with 6" Effect Wheels

If you want to project a gobo using a 6" Effect Wheel to add to the effect or alter it this is what you will need. For lens selection see page 9.

Projector + Lens
1 x Custom B/W 50mm Gobo
1 x Slide/Gobo Holder with 1/2rpm Wheel Rotator

1 x 6" Liquid Wheel

Moving colours mingle and slide through the projected image.

1 x 6" Cloud Wheel

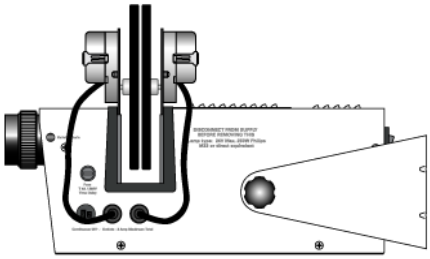
The Cloud wheel, combined with a custom gobo, gives the effect of clouds drifting by a window.

1 x 6" Mild Distortion Wheel**

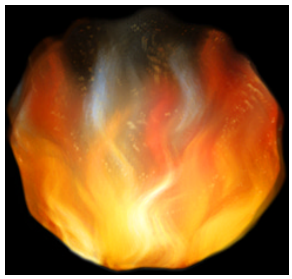
The image is distorted as if projected through water.

6" Effect Wheel Distortion

Combine a Standard Effect Wheel in the rear gate with a Mild Distortion Wheel wheel in the front gate, on separate Wheel Rotators, to creat underwater or flickering flame effects.



6" Deep Wheel (FG7049) combined with a No.1 Distortion wheel.



6" Fire Wheel (FG7053) combined with a No.1 Distortion wheel.

6" Wheel Effect Creation

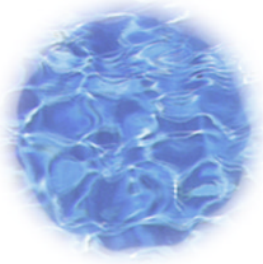
By combining two wheels on separate Wheel Rotators one can create some impressive stand alone effects. Two examples of which are shown below.

Sunlight through trees

K4 Projector +
2 x 6" Wheel Rotators
1 x 6" Dot Beam Wheel*
1 x 6" No.2 Distortion Wheel

Light on water

K4 Projector +
2 x 6" Wheel Rotators
1 x 6" No.2 Distortion Wheel
1 x 6" No.3 Distortion Wheel



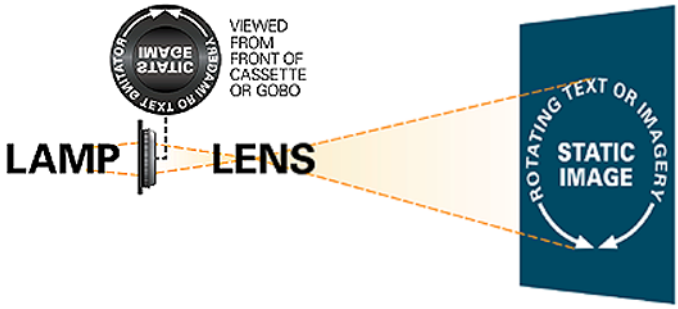
* A dot Beam Cassette on Cassette Rotator can also be used.

FITTING GOBOS & ACCESSORIES

Orientation

For front projection the image should be loaded reverse reading upside down when viewed from the front.

For use with a mirror or for rear projection the image should be right reading upside down.



IMPORTANT

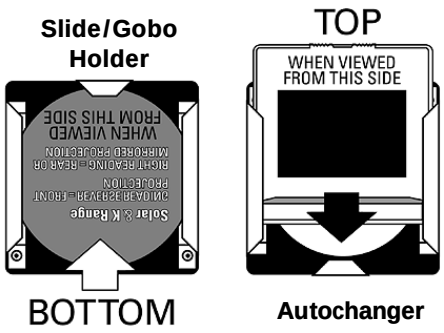
All accessories fitted in the projector must be secured to it. Later accessories from OPTI are provided with a ring so they can be anchored to the safety chain eye under the projector.

Effects Accessories

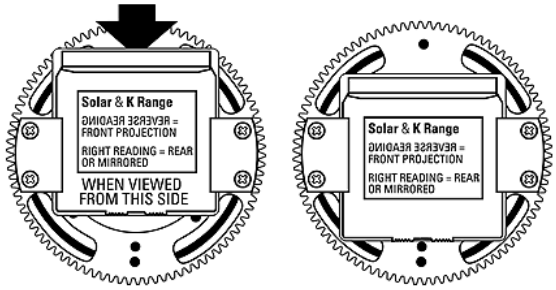
Fitting 50mm Gobos or 35mm Slides

Slide/Gobo Holders load from the bottom. Push duplicate slide or gobo into place. A gobo may need to be rotated to a square position.

Autochangers always start from position 1, marked by a notch.

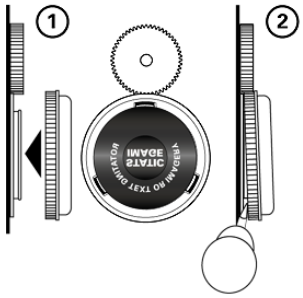


Load from top. Then rotate turret anti-clockwise to next position.



The same instructions apply to Gobo Rotators and Autochangers.

Fitting 50mm Cassettes

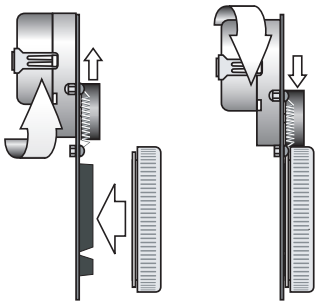


1. Simply push onto the circular plastic rim of holder engaging outer gearing of cassette with gear wheel on rotator.

If there is lettering or an image on the static piece of glass align it upside down and as square as possible.

2. Remove by gently prising off with flat ended screwdriver.

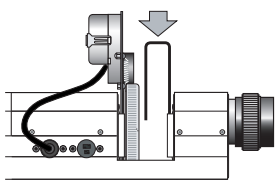
Fitting 3" Cassettes



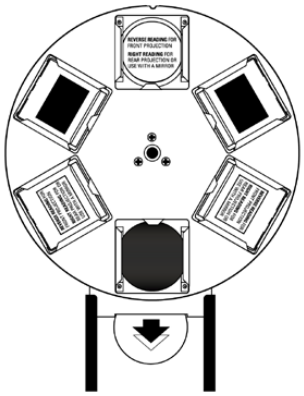
1. Pull the motor up (on the back) to lift Drive Tyre.
2. Position 3" Effect Cassette over the flanges on the base plate with the inner image (if custom double) upside down and parallel to the bottom of the base plate.
3. Push Cassette over bent flanges of Cassette Rotator until securely and evenly fixed. Take care to only apply pressure to the metal outer casing of the Cassette.
4. When Cassette secured release motor to engage drive tyre.
6. To remove, pull the motor up to release the drive tyre.
7. Gently prise off the cassette with flat ended screwdriver.

Fitting Cassette Safe

Slide the Cassette Safe into the front gate of the projector. This will ensure the Cassette will not fall out and be damaged if it becomes loose from the Cassette Rotator.



Fitting Effect Accessory into the projector



The accessory holding the main projected effect(s) should be in the the rear gate (closest to the lamp). This will give the best effect illumination and longest effect life.

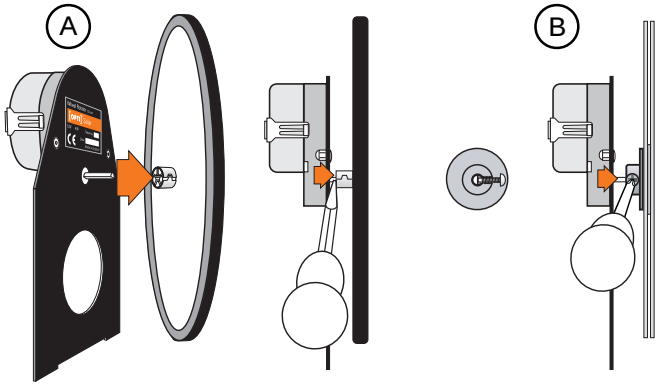
1. Slide back plate of the effect accessory into rear gate runners of projector.
2. Slide firmly home.
   Ensure that the base of the back plate of the effect accessory is at the bottom of the projector's gate runners. This is for optimum safety and will ensure that the effect(s) are in the correct position for projection.

IMPORTANT
Never use an Autochanger with the projector mounted at an angle where it might fall.

Fitting an Effect Wheel

To project an Effect Wheel you will need a Wheel Rotator (see top of page 7 for options).

Fit the central boss of the wheel over the 'D' section drive spindle of the Wheel Rotator. If it is a plastic Wheel (A) the boss is self fixing. If the Wheel is 575 safe (B)tighten the screw onto the flat side of the 'D'.

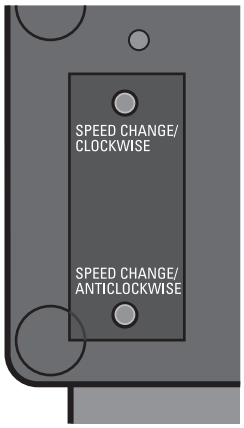


To remove a plastic Wheel (A) gently prise the boss off with a flat ended screwdriver. If the Wheel is 575 safe (B) loosen the screw off of the flat side of the 'D' and pull off Wheel.

Adjusting Variable Speed and Direction Wheel Rotator

Most Wheel Rotators are fixed speed.

The VSD Wheel Rotator has buttons on the back that adjust direction and speed. Press these buttons to increase or decreas speed and change direction.



Lens Selection

The standard lens supplied with your projector is a three element 85mm f2.8 42.5mm diameter plastic helical focussing groove unit.

Lens selection is important because the lens affect the size of the projected image and can affect the possible projection distance.

LENSES

60mm	FG6150
85mm	FG6160
100mm	FG6170
Zoom Attachment	FG6120

60mm 85mm 100mm Zoom

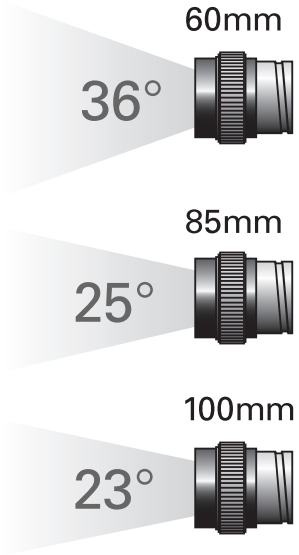
Lens Angles

The focal length of a lens determines how wide an angle the image is projected.

In simple terms the larger the number of the focal length of the lens the narrower the beam. The lower the number the wider the angle. This angle is called the 'inclusive angle'.

The illustrations show the inclusive angles for OPTI Solar lenses.

The 'inclusive angle' of each lens can be plotted on design drawings to determine the projected image size.



Lens Selection Calculations

The formulae below are to help select right lens for your application. All dimensions in millimetres.

1. IMAGE SIZE = $\frac{\text{PROJECTION DISTANCE}}{\text{FOCAL LENGTH}}$ X OBJECT* SIZE

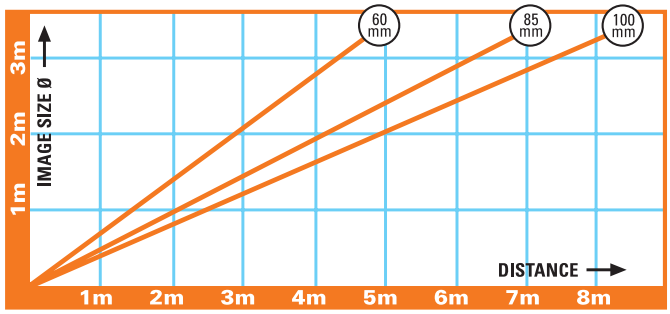
2. PROJECTION DISTANCE = $\frac{\text{IMAGE SIZE}}{\text{OBJECT SIZE*}}$ X FOCAL LENGTH

3. FOCAL LENGTH = $\frac{\text{PROJECTION DISTANCE}}{\text{IMAGE SIZE}}$ X OBJECT* SIZE

4. OBJECT* SIZE = $\frac{\text{IMAGE SIZE X FOCAL LENGTH}}{\text{PROJECTION DISTANCE}}$

Lens Selector Chart

Shown here are image sizes and projection distances for OPTI Solar lenses based on object size of 35mm diameter.

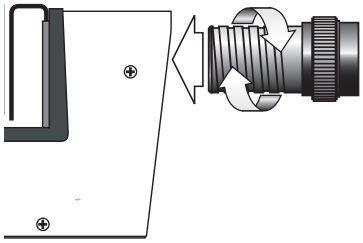


Lens Fitting & Focus

In order to project a crisp focussed image it is necessary to adjust the focussing lens after the unit has been aimed at the desired projection surface.

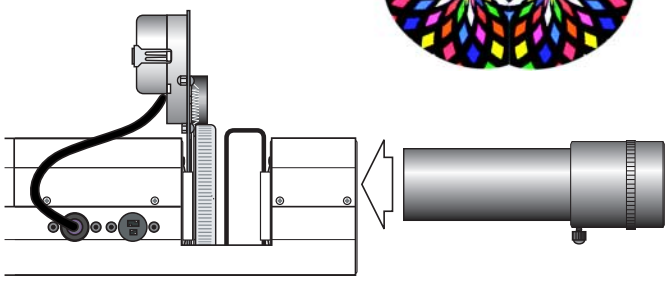
Fitting the lens

1. Insert the lens until it meets resistance.
2. Rotate clockwise to locate.
3. Rotate lens in either direction to focus.



Kaleidoscope Lens Fitting & Focus

The OPTI Kaleidoscope Lens replaces the focussing lens and repeats a section of an effect as a six sided image. It fits directly into the OPTI Solar 250 and 100C projectors.



Fit Lens

1. Ensure the lens locking screw is slackened off.
2. Slide in the Kaleidoscope lens until desired focus is achieved.
3. Fine tune by turning the end of the lens and tighten lens locking screw. (This fixes the adjustable part of the lens in place).

Front of Lens Effects Accessories

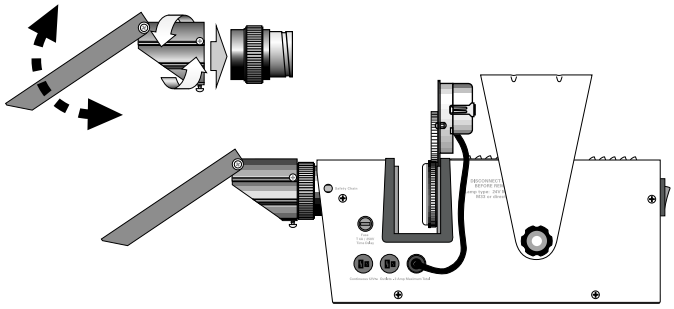
Front of Lens Accessories fall into two main categories. Mirrors and Prisms. Mirrors deflect the image. Motorised models also move the image. Prisms fragment and multiply the projected image.

The third category is covered by the Fly Eye mirror which deflects, fractalises and animates the image.

MIRRORS

Solar Deflector	FG6310
Linear Motion	FG6311
Circular Motion	FG6312
Barrel	FG6315

Static 'deflector' mirrors are used to simply reflect light to where it's required whilst moving mirrors add dynamism to the image being projected thereby catching attention. All OPTI mirrors can be adjusted through 360 degrees to project images onto walls, ceilings, floors or any other surface.



Fitting Deflector Mirror

The Solar Deflector mirror is the simplest mirror to fit.

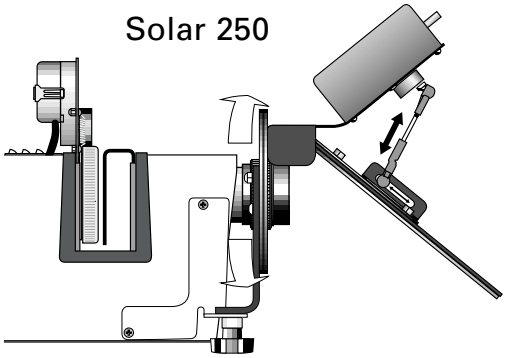
1. Loosen off the 3 screws around the perimeter of the circular fixing section.
2. Place over the end of the focussing lens.
3. Turn through 360° to the direction of where you want the image to project and tighten the 3 screws.
5. To adjust angle of the mirror - loosen the 2 screws on each side of the mirror.
6. Move mirror to desired angle and tighten screws.

Motorised Mirrors

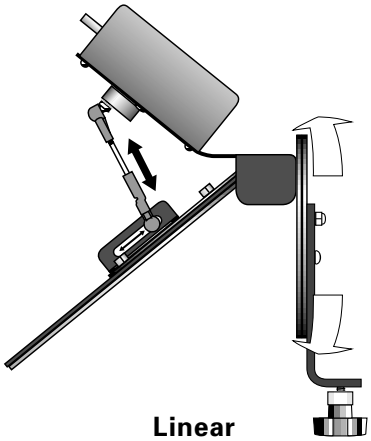
Motorised mirrors can be fitted onto the front of the Solar 250 projector using K Mirror Brackets FG2020.

1. Remove the two screws on either side of the front section of the projector (4 in total).
2. Place mounting brackets either side of the projector and replace screws through holes in the bracket.
3. Line up screw threads on the mirror with slots on the mounting bracket. Place the nylon collar over the screw thread, under the bracket. Screw on and tighten the knobs.

Solar 250

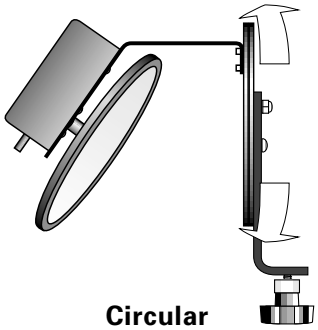


4. For individual adjustment of the mirror see the relevant mirror instructions.



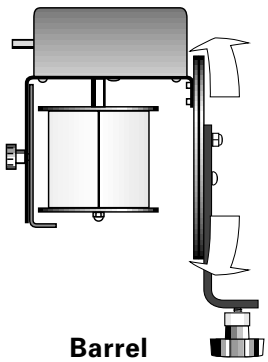
Linear

Moves the image back and forth in a straight line of adjustable length.



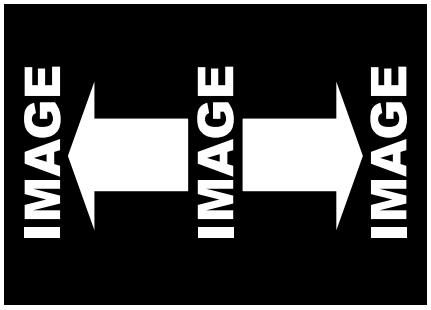
Circular

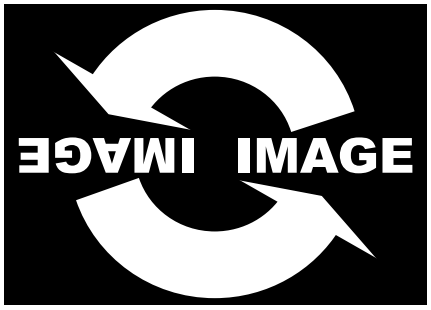
Moves the image in a circular orbit of adjustable size and direction.

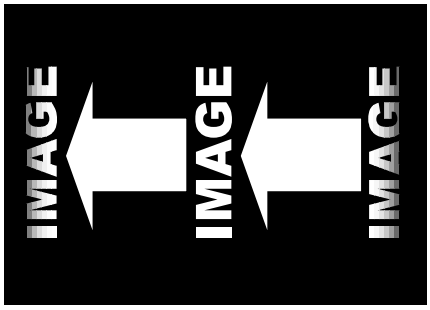


Barrel

Repeatedly pans the image in one direction in a straight line of adjustable length.





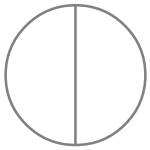


Front of Lens Effects Accessories

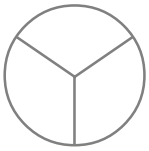
Clip-on Prisms

Available for the Solar range with two, three or four facets. Clip-on Prisms attach to the front focussing lens of the OPTI Solar 250 or 100C and reproduce the effect being projected two, three or four times respectively. OPTI Clip-on Prisms can be swivelled to alter the spread of the images.

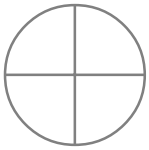
2 Facet
FG6210

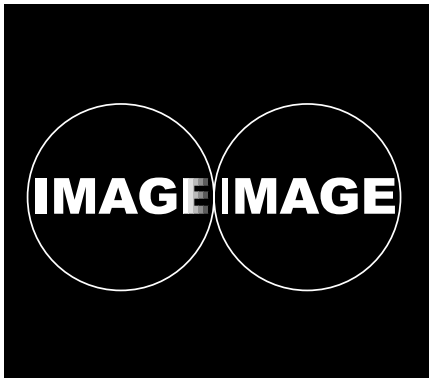


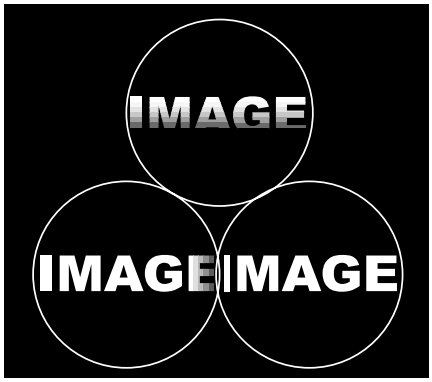
3 Facet
FG6220

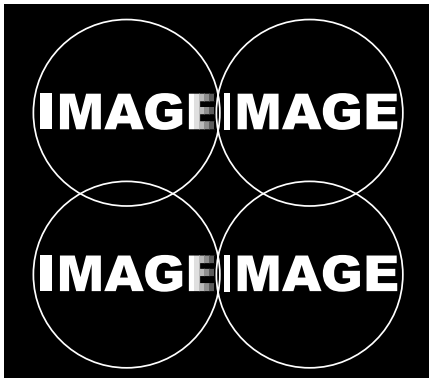


4 Facet
FG6230









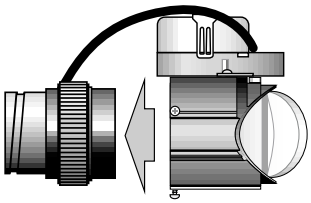
Panoramic Rotator

The OPTI Panoramic Rotator is a motorised vertical 2 Facet prism that attaches to the front focussing lens and scans repeated images through 360°.

Fitting Prisms

The Solar Deflector mirror is the simplest mirror to fit.

1. Loosen off the 3 screws around the perimeter of the circular fixing section.
2. Place over the end of the focussing lens.
3. Turn through 360° to the split pattern/direction you want to project.
4. Tighten the 3 screws.
5. To motorise the Panoramic Rotator prism - plug into one of the 12V~ sockets on the side of the projector.



Panoramic Rotator on an OPTI Solar 100C projector.

FG6060

Lamp Changing

The Solar 100C and Solar 250 are both have quartz halogen 2 pin lamps. The Standard lamp for the Solar 100C (150W M28) has an average life of 2000 hours. The Standard lamp for the Solar 250 (250W M33) has an average life of 300 hours. An alternative lamp (250W Eye) is available for the Solar 250 and has a life of 2000 hours at a slightly reduced light output. See Technical Data on page 13 for more details.

LAMP CHANGING

Switch off the Effects Projector, disconnect from the mains and allow to cool for 20 minutes, then:

1. Remove lamp cover screws (2 either side on the Solar 100C*, 1 on the top side of the Solar 250) and remove lamp cover.

2.a On the Solar 250 remove internal lamp cover plate.

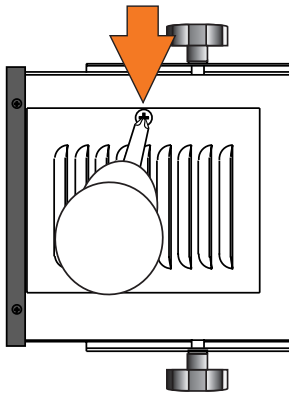
2.b On the Solar 100C loosen the screws either side of the lamp cover plate and lift to vertical position.

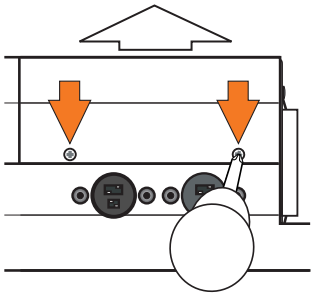
3. Remove old lamp without touching with bare hands.

4. Replace with the appropriate new lamp. (Taking care not to touch with bare hands).

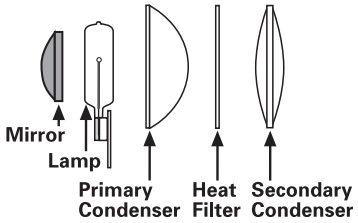
5. Replace and secure internal lamp cover plate.

6. Replace and secure the cover with screws.





Optical System



IMPORTANT*

The rear gate is part of the Solar 100C lamp cover. The whole thing is removed as one unit.

Take care with the earth wire which is connected to the underside of the cover on the opposite side to the 12V~ sockets.

OPTICS CLEANING

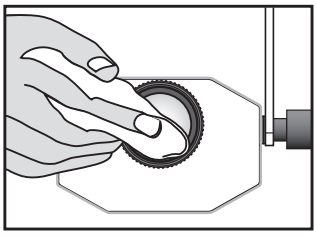
After 3 months (or 500 hours) use, or when changing the lamp, the optical system may need cleaning.

Switch off the Effects Projector, disconnect from the mains and allow to cool for 20 minutes, then:

1. Remove covers as detailed in previous section.
2. Use a soft tissue or lens cloth with a little methylated spirit or pure alcohol to clean lenses.
3. To clean the mirror, first remove the lamp as detailed in previous section, then wipe with a soft tissue as above.

The focussing lens may also need cleaning from time to time.

Once again use a soft tissue or lens cloth with a little methylated spirit or pure alcohol to clean lens.



Cooling System

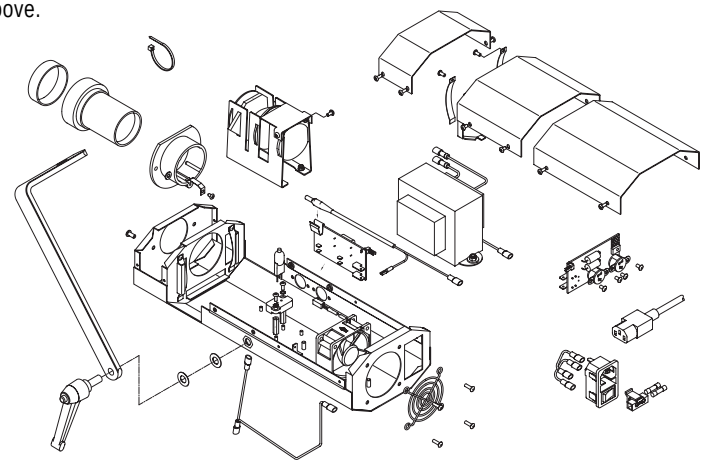
The projector is equipped with a forced-air cooling system. This serves two purposes, firstly to cool the components within the projector itself, and also to cool any accessory installed in the gate of the projector.

It is essential that no air inlets or outlets are obstructed at any time when the unit is on. If this happens a safety cut-out switch will turn off the projector before it overheats after a little time, during which the effect in the gate may overheat and be irreversibly damaged and fuses may be blown.

[OPTI]™ Solar 100C

DESIGNED AND MANUFACTURED IN THE UK

Overall size	340mm long (without lens) x 125mm wide x 81mm deep (225mm deep with hanging bracket).
Weight	3.5kg.
Standard lens	3 Element 85mm f2.8 42.5mm Helical Focus Groove.
Mains voltage	110 - 120V~ or 220 - 240V~ 50/60Hz.
Power consumption	115 Watts maximum.
12V~ output current	400mA maximum.
Lamp type	M28 12V 100W EVA.
Lamp life	Average 2000 hours.
Total light output	575 lumens with new lamp.
Colour temperature	3100 K.
Cooling	Tubeaxial fan.



[OPTI]™ Solar 250

Technical Data

Overall size	333mm long (without lens) x 130mm wide x 140mm deep (225mm deep with hanging bracket).
Weight	5.79kg.
Standard lens	3 Element 85mm f2.8 42.5mm Helical Focus Groove.
Mains voltage	110 - 120V~ or 220 - 240V~ 50/60Hz.
Power consumption	350 Watts maximum.
12V~ output current	3A maximum.
Lamp type	Osram Xenophot M33 24V 250W (or Iwasaki Eye) EVC.
Lamp life	Average 300 hours (or 2000 hours).
Total light output	1200 lumens (or 800 lumens) with new lamp.
Colour temperature	3300 K (or 3000 K).
Cooling	Tubeaxial fan.