# Transparent Electrode

## KPP-100-250

Transparent Conductors for Electrography (Kirlian Photography)

### Features and Specifications

- Large transparent, electrically conductive surface
- Conductive layer < 7 ohms/m
- Simple electrical connection
- Various sizes available
- Conductive Area: 100x100 mm or 250x250 mm


**WARNING:** Kirlian photography requires the use of very high voltages. Operating high voltage devices should only be performed by experienced persons

The Transparent Electrode KPP-100-250 is a large transparent conductor on a glass substrate and mounted in an acrylic frame with electrical contacts. One side of the glass panel is coated with a layer of Indium Tin Oxide allowing for good conductivity and high optical transparency.

Designed for electography (kirlian photography). These electrodes when combined with a high voltage power supply can be used to visualise electric fields around objects by creating corona discharge glows in air or other gasses.

At only 2.25mm thick, the electrodes can be easily stacked or layered for alternative experiments where optically transparent electrical conductors are required. The supporting frame and included supports have various 3mm holes to aid in mounting for custom applications.

### Example Applications

- Electrography
- Kirlian Photography
- EMI shielding for cameras or lights
- Optical Experiments
- And more…

## ELECTRICAL CHARACTERISTICS

NB: Figures may vary under different loading conditions and environments.

| Symbol | Parameter | | Min | Max |
|---|---|---|---|---|
| $R_{ITO}$ | Resistance of conductive layer | | 5 ohms/m | 7 ohms/m |
| $T_{PER}$ | Optical Transparency | | 84% | 90% |
| $T_{AREA}$ | Transparent Conductive Area | 100mm Version | 90 x 90 mm | 100 x 100 mm |
| | | 250mm Version | 240 x 240 mm | 250 x 250mm |

*Table 1: Electrical Characteristics*

# Usage Guide

The guide below shows an example of how the electrodes can be used for electrography. Here the electrode is used in conjunction with a HV Spark Coil and Power Pulse Modulator PWM-OCXi. The electrode is provided with a set of plastic supports which can be slotted together in various ways for supporting the electrode or sample being viewed.

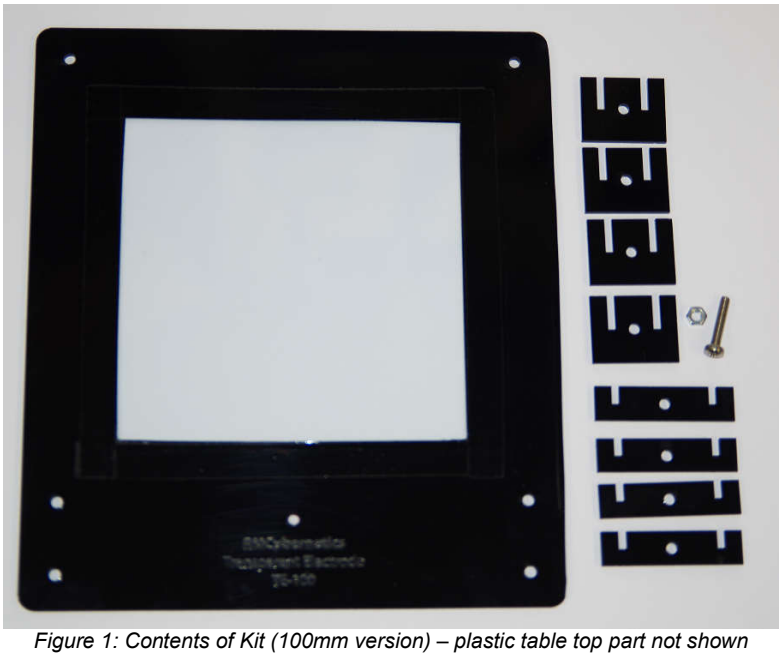

*Figure 1: Contents of Kit (100mm version) – plastic table top part not shown*

**Important notes**

This information is only a guide. Experience of working with high voltages is essential for safe and proper operation of this device

- **Do not allow the sample to contact or be in proximity of the conductive side.**
- **Corona or sparks to the conductive side may permanently mark or damage it.**
- **The conductive side is identifiable by the copper contact.**
- **Samples should be placed against the non-conductive side.**
- **The non-conductive side is identifiable by the engraved text *(see figure 1).***
- **The background surface should ideally be matt black to prevent reflections from interfering with the image. A white background is shown in this datasheet so that the individual parts can be seen clearly.**
- **You will need to work in a dark or dimly lit environment.**
- **A high frequency adjustable (50Hz to 20kHz) AC or pulsed HV supply will give the best results. A supply voltage of around 20kV is typical.**
- **High voltage corona can generate small amounts of toxic gasses such as Ozone and Nitrous Oxides. Good ventilation is needed.**
- **Apply the high voltage for short periods only when needed to reduce gas by-products and to prevent heating of the glass.**
- **Avoid placing sample objects near the edges of the transparent area.**

The sample (item to be photographed) needs to be supported and placed on a black background. Use the supports provided and insert a wire through the hole in the centre of the plastic table. In the examples here, a coin is used.

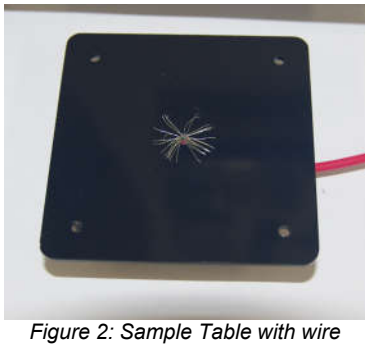

*Figure 2: Sample Table with wire*

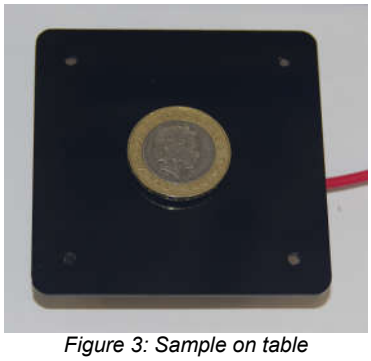

*Figure 3: Sample on table*

The wire shown above will be connected to a high voltage supply and should therefore be supported away from the surface of your desk or workbench to prevent losses. For best results the sample should be relatively flat and be supported such that it will press against the glass surface of the electrode. If the table supports do not allow the sample to reach the glass, it can simply be taped in place.

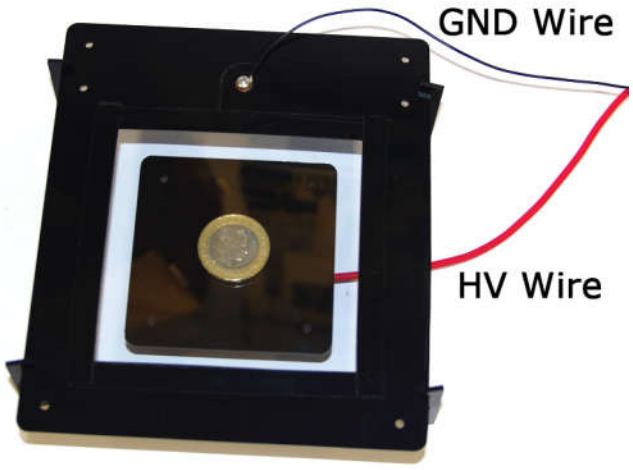


*Figure 4: Example setup using provided supports and sample table*

The most common configuration would be to have the Transparent Electrode connected to GND, and the HV supply connected to the sample directly (see figure 4 & 5). This way prevents corona losses from the conductive surface and concentrates the corona around the sample object. This also has the added safety of the exposed area being grounded and high voltage parts underneath away from the camera and the user. See figure 8 for example wiring diagram using our PWM-OCXi and HV Spark Coil.

It is possible to have the Transparent Electrode as the high voltage terminal if required, but consideration must be given to the fact that there may be corona losses around the edges of the conductive surface, and that there will be a large exposed high voltage surface on the top of the setup.

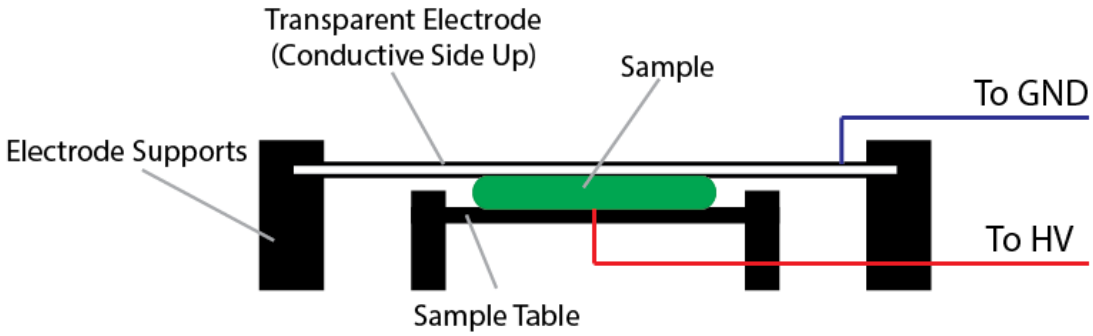


*Figure 5: Typical Configuration*

Under normal lighting conditions the corona may not be visible. It will be necessary to work in low light levels to be able to see the corona with the naked eye. To take photographs a long exposure might be needed so it is important to have the camera on a tripod to prevent blurring from movement.

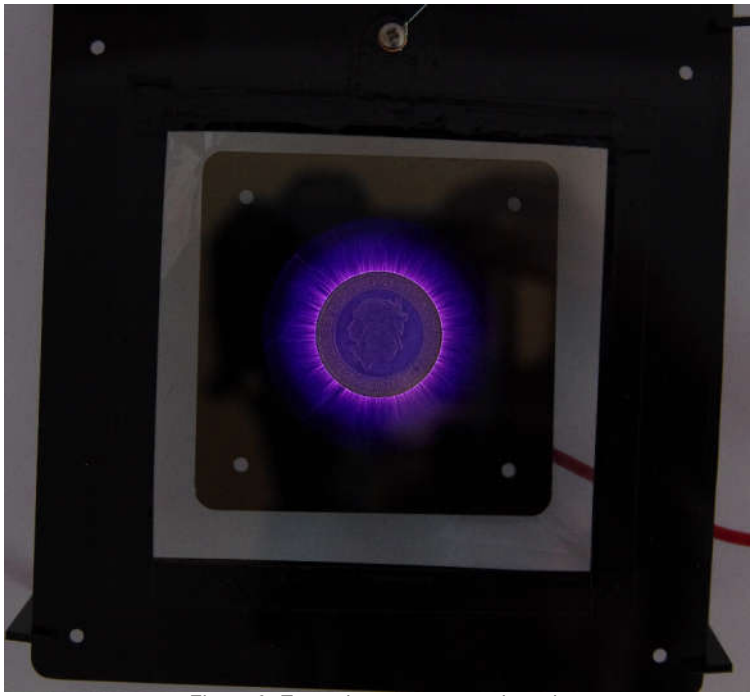

*Figure 6: Example corona around a coin*

By adjusting exposure times, supply voltage and frequency many different effects can be achieved. The photo in figure 6 was taken with the following settings on a DSLR camera: f/4, ISO-3200, 1/8 seconds. Check out our website for more example photos.

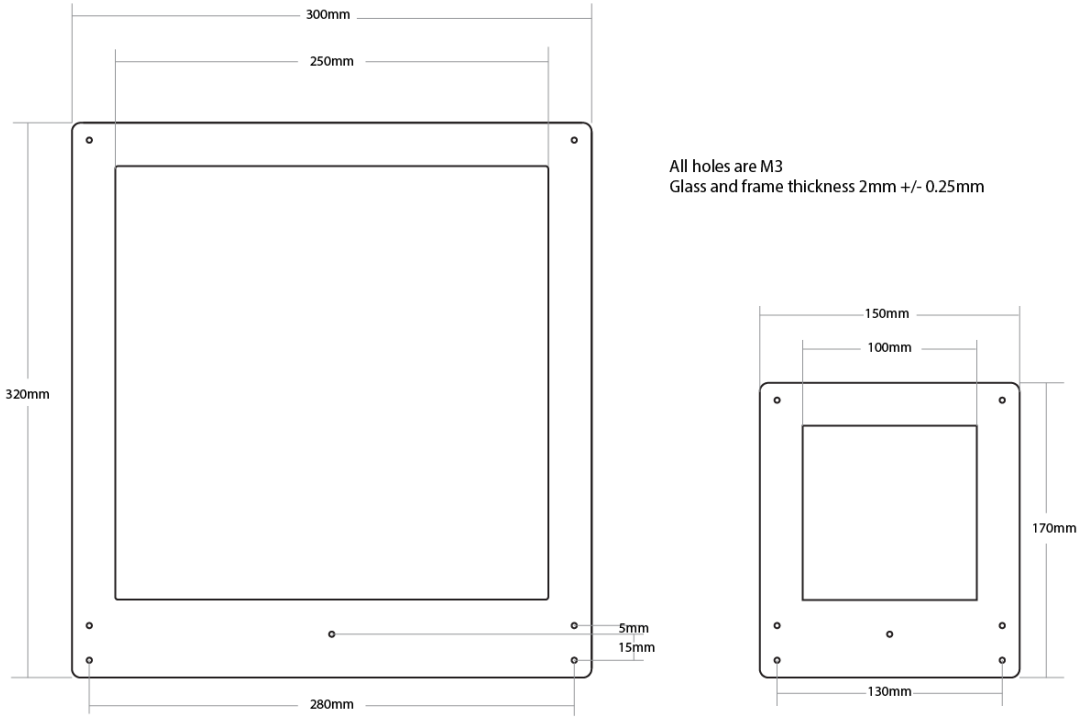


*Figure 7: Dimension Drawing*

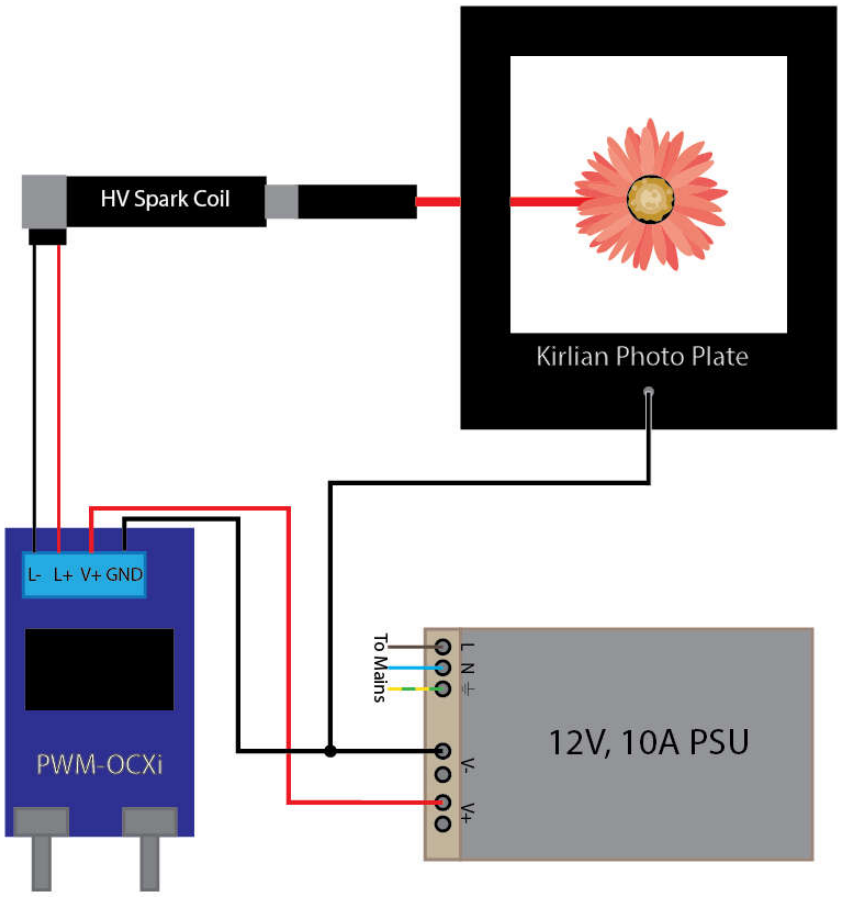


*Figure 8: Example Wiring Diagram using our PWM-OCXi, HV Spark Coil, and 12V 10A PSU*

## Related Products

| Product | MPN |
|---|---|
| HV Spark Coil | HV-SC20K |
| Power Pulse Modulator | PWM-OCXi |
| 12V, 10A PSU | 12V10ASMPS |