



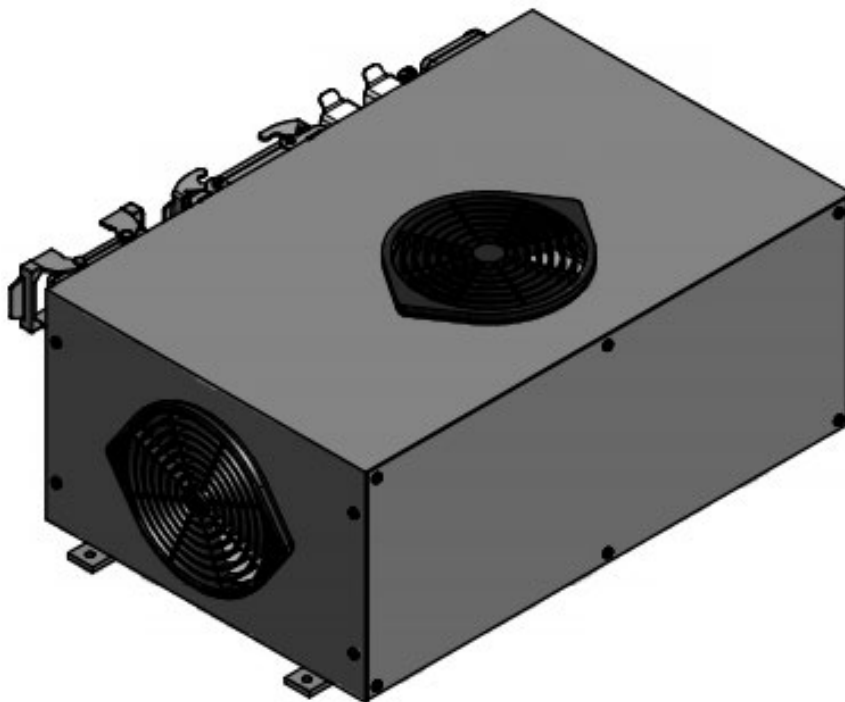
**Corona Supplies Ltd**  
for all your corona needs

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# **CS 3005-30**

## **POWER SUPPLY**



# **PRODUCT MANUAL**

## **Remote Operator Panel**

# Requirements

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**IMPORTANT:** *Please read this information BEFORE installing and operating the equipment.*

## **Intended Users**

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, EMC considerations, and to enable the user to obtain maximum benefit from the equipment.

## **Applications**

The equipment described is intended for industrial & commercial surface treatment of various poly and non poly substrates.

## **Personnel**

Installation, operation and maintenance of the equipment should be carried out by competent personnel. A competent person is someone who is technically qualified and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

# Safety

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## Product warnings



DANGER  
RISK OF ELECTRIC SHOCK



CAUTION  
REFER TO DOCUMENTATION



DANGER  
MOVING MACHINERY  
RISK OF CRUSHING



DANGER  
RISK OF ENTANGLEMENT  
PINCH POINT



DANGER  
HEAT SOURCE  
RISK OF BURNS

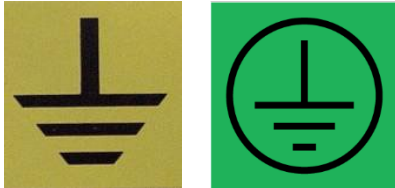


CAUTION  
OZONE CONNECTION PORT

## Hazards

### **WARNING!!! Ignoring the following may result in injury or death**

1. This equipment can endanger life by exposure to high voltages, heat and rotating machinery.
2. The equipment must be permanently earthed due to the high earth leakage current, and the treaters station must be connected to an appropriate safety earth. Earth connection points are shown with the following label.



3. Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the corona power supply.
4. Allow at least 3 minutes for the corona power supply's capacitors to discharge to safe voltage levels (less than 50V).
5. For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range. CAT I and CAT II meters must not be used on this product.
6. Guards, covers & doors must NOT be removed unless the corona power supply has been switched off and the incoming supply isolated.
7. During the corona treatment process a high level of heat is produced at the electrodes which will be transferred to the base roller. Before attempting any maintenance wait at least 10 minutes after switching the machine off to allow electrodes and associated parts to cool down.
8. Ozone generated by the corona process must be removed from the treaters station by a suitable extraction system manufactured from corrosion resistant materials.
9. Access Covers and doors that are regularly required to be opened for correct machine setup & cleaning are protected with a safety device which must be checked for correct operation / damage as shown as detailed in the maintenance part of this manual.

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APP.A: ELECTRICAL DIAGRAMS

APP.B: INSTALLATION GUIDE (Customer Specific)

## Machinery data

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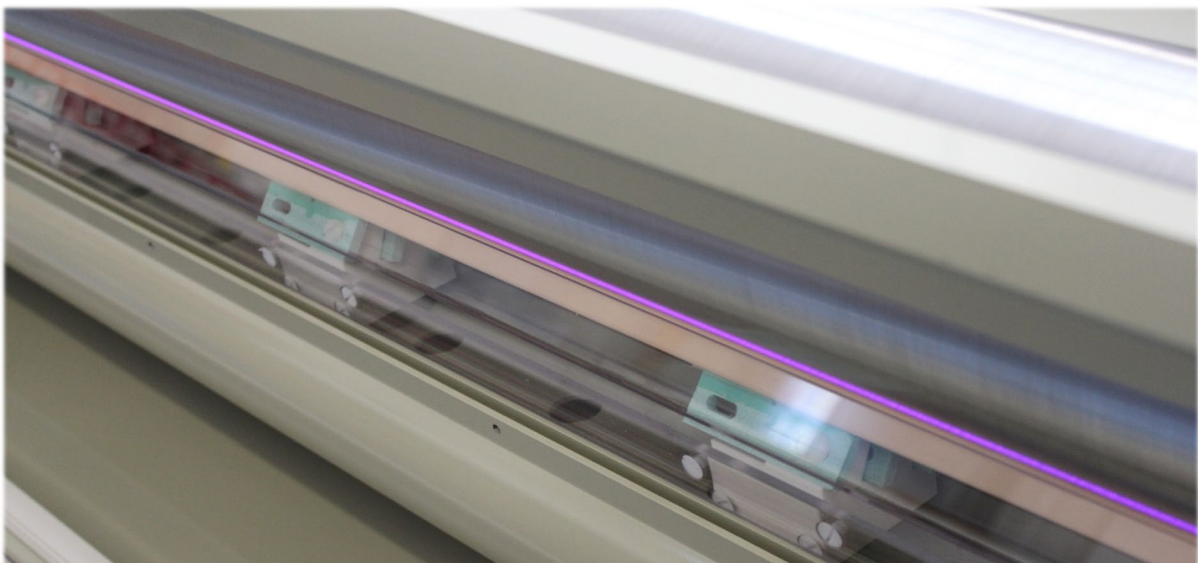
Insert Machinery data here

# Introduction

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## The corona treating process

Gases are normally very good electrical insulators or dielectrics. In the presence of a very strong electrical field a gas can be forced to break down and lose its insulating capability. During this breakdown the gas molecules begin to ionize. This enables them to provide a conductive path from one molecule to another. In a treating system the strong electrical field is generated across an air gap between the electrode assembly and the treater roll. A conductive path between these two electrodes will be completed when a sufficient quantity of gas (usually ambient room air) has become ionized. A sudden discharge across this path will now occur usually resulting in a bright flash or arc. This is very similar to a lightning flash going to earth or the arc between electrodes in a laboratory experiment. In order to prevent this arc from completely developing a solid dielectric barrier is placed in the path between the electrodes. This barrier partially interrupts the conductive path preventing a complete breakdown of the gas. Instead of a hot localized arc, a cooler diffuse glow will occur. This soft violet colored discharge indicates the incomplete breakdown of the gas and is called a corona. The material the dielectric or barrier is composed of is chosen so that enough current will flow between the electrodes and through it to sustain this corona.



During the treatment process, the web is passed through a high voltage discharge field and is exposed to the bombardment of high-energy particles. This corona field has the potential to break polymer bonds, cause micro-pitting, and deposit an induced surface charge with extremely high levels of strong oxidizing agents onto the web. Any one of or possibly all of these processes can alter the surface characteristics of the material in a way, which enhances the surface adhesion and its ability to accept printing inks, adhesives, coatings, etc.

# Installation

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## **CAUTION!!!**

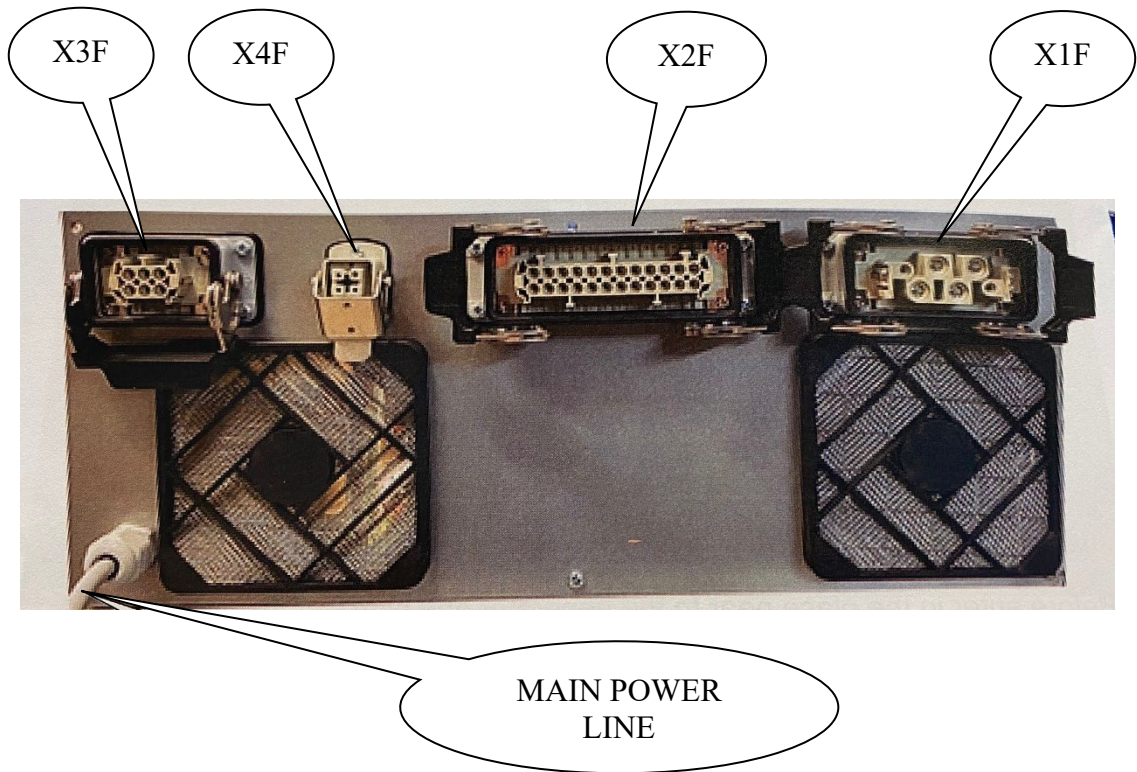
**Do not install this equipment in wet environments subject to high humidity.**

### **Generator**



- Mount the generator cabinet horizontally or vertically to a flat surface in a position leaving at least 200mm on all sides to allow for sufficient cooling and to allow for periodic checking and maintenance of the fan filters.
- The generator cabinet should be located in a position that does not allow the operator to interfere with the connections while the unit is running, i.e. in locked cabinet.





- Connect the interlock circuit to socket X3F.
- Connect the speed sensor (BSR) cable to socket X4F.
- Connect the supplied remote-control unit to plug X2M.
- Connect the high voltage transformer (THV) cable to socket X1F
- Cables should be attached to the machine frame or run in cable trays so that they cannot become a trip hazard and are out of operators reach.
- Customer interlocks / line E-Stop circuit should be connected to either pins 8 – 11 socket X2F or pins 1 – 4 plug X3M as shown in the installation diagram.
- Check the power supply voltage and generator plate. Make sure the power supply has a dedicated earth and is protected with a 30mA differential earth breaker.
- Once the above have all been checked, connect the generator to the power supply.

## Startup

- Turn “ON” the main supply to the generator.
- Ensure the interlock circuit is closed. Ozone extraction running, doors / covers closed, treater box closed, E-stop button closed, etc.
- The QCM contactor should activate (Main supply contactor).  
**ATTENTION!!! The generator will not start if the QCM contactor is not powered.**
- The QC1 contactor should be activated after a one second delay (IGBT line contactor).

**ATTENTION!!! The generator will not start if the IGBT line contactor QC1 is not powered.**



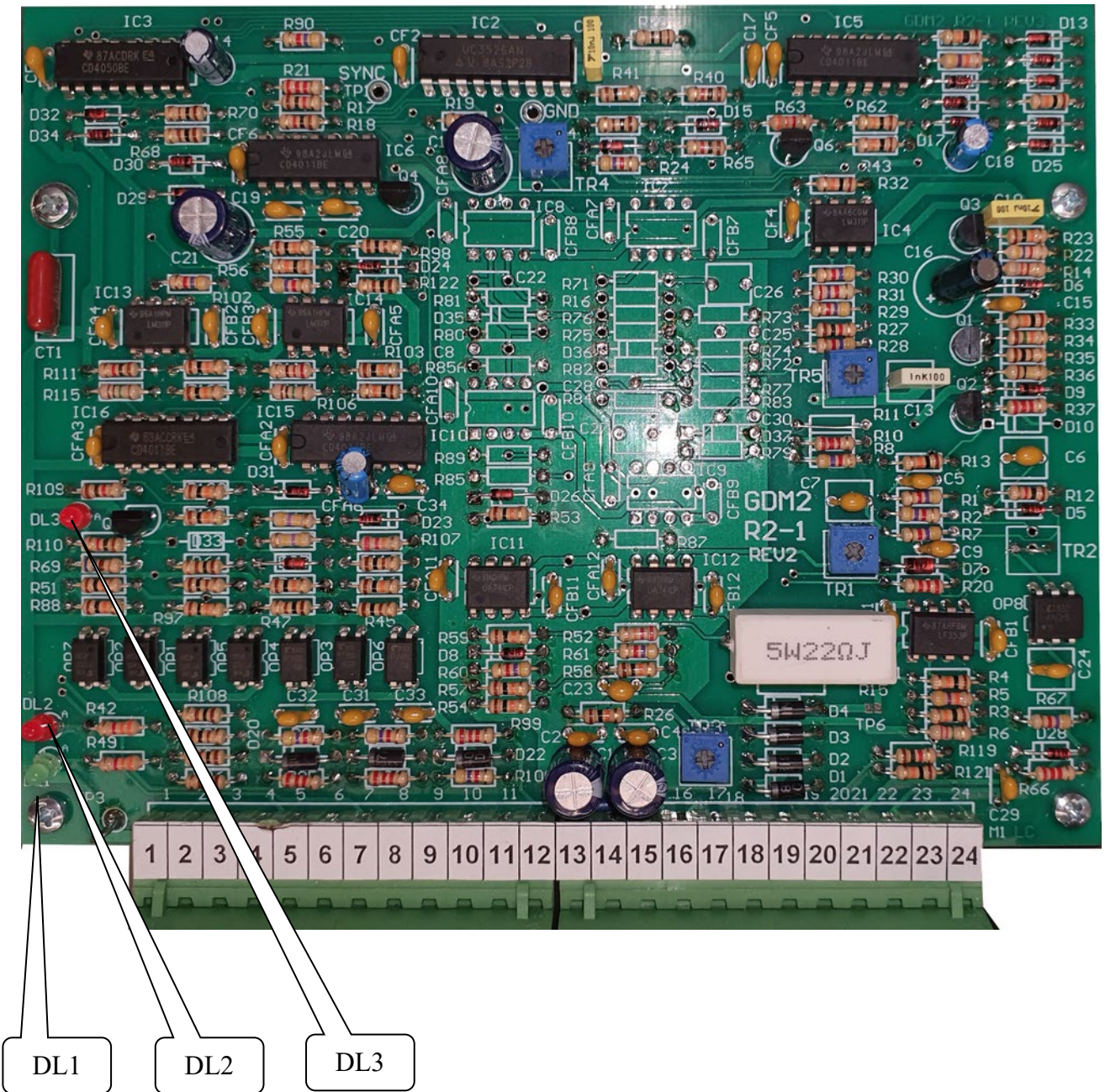
- To start the generator, ensure the interlock status LED is illuminated.
- Press the start button until the green light illuminates.  
Flashing = Generator in standby (Line stationary).  
Steady = Generator running (Line running)
- Adjust the power control dial to the required power setting. To achieve a stable & even corona the set point should be between 5 and 10.

**ATTENTION!!!** If the power meter displays O/R, the power control dial should be reduced so that the meter reads between 0-10.

- To stop the generator, press the stop button until the red LED illuminates.
- If a fault occurs (short-circuit, etc) the Yellow LED will illuminate, and the generator will stop (red LED illuminates). To restart the generator the fault must be cleared by pressing the stop button until the yellow LED goes out.
- If a fault continues to occur the generator should be switched off and the fault investigated by following the troubleshooting guide.

# Troubleshooting

## GDM2-R10 PCB status LED's



- DL1 = GDM2-R10 card in start condition – Generator running
- DL2 = GDM2-R10 card in overload alarm – Output short circuit
- DL3 = GDM2-R10 card in low current alarm – Output open circuit

## General Faults

### Generator does not start:

- Check power supply to generator.
- Check interlocks are closed - INTERLOCK led ON.
- 24Vdc failed – Check fuses F1 & F2.
- Check QC1 contactor is energised.
- Check QCM contactor is energised – Check overload (FAM).

### Interlock circuit open (Interlock status LED OFF)

- Electrode carriage is fully home (SBP1 closed).
- Check Ozone extraction fan is running and ducting from the treater unit to the extraction fan is OK (pressure switch closed).
- Check E-stop buttons have not been pressed.
- Check interlock safety relay (KE).

### Generator does not treat:

- Check Start button has been pressed and LED is ON & steady.
- Check Fault LED is OFF.
- Check DL1 led is ON – GDM2-R10 PCB in start condition.
- Check DL2 led is OFF – GDM2-R10 PCB in overload alarm .
- Check DL3 led is OFF – GDM2-R10 PCB low output current alarm.
- Check the treater roller is rotating, (start button LED ON steady) – See rotation detection section.

### Fault LED illuminated:

#### Overload fault (Short circuit)

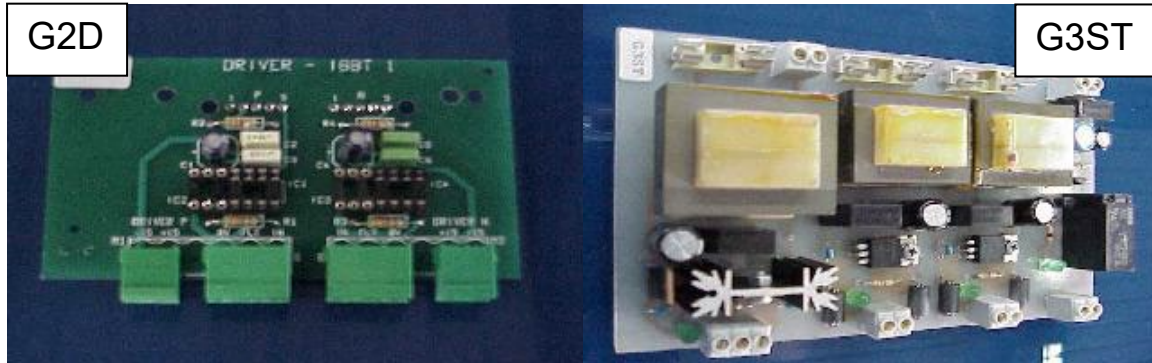
- Check insulators inside treater unit are clean and free from moisture & contamination, clean if necessary.
- Check Ceramic electrodes and mounting flags are clean and free from moisture & contamination, clean if necessary.
- Check ceramic electrodes are not damaged (cracked or pin holed).
- Check the condition of the flexible high voltage cable.
- Check high voltage transformer (THV) – See testing the high voltage transformer section.

#### Low current fault (Open circuit)

- Check plug X1M is connected and locked in place.
- Check the electrode carriage is fully home.
- Check for continuity from the secondary of the high voltage transformer to the ceramic electrodes.
- Check high voltage transformer (THV) – See testing the high voltage transformer section.

## Treatment fault (IGBT)

- Check cooling fans are operational and filters are clear.
- Check 15V present on G2D PCB.
- Check 15V & 12V present on G3ST PCB.
- Check IGBT



## Rotation detection

If the start button LED continues to flash when the treater roller is rotating check the following:

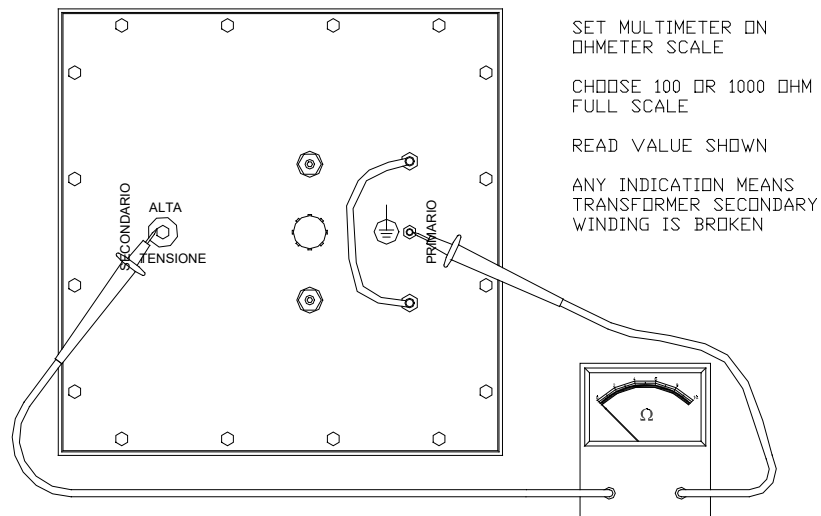
- Check the web is not slipping over the treater roller (increase web tension).
- Check for rotation sensor (BSH) is working and positioned approximately 1-2mm away from the roller. When the sensor is working the green LED on the HVC5 PCB will be flashing as the roller is rotating.
- Check speed relay (GSE1) is secure in its base.

## Testing the high voltage transformer (THV) - Continuity check

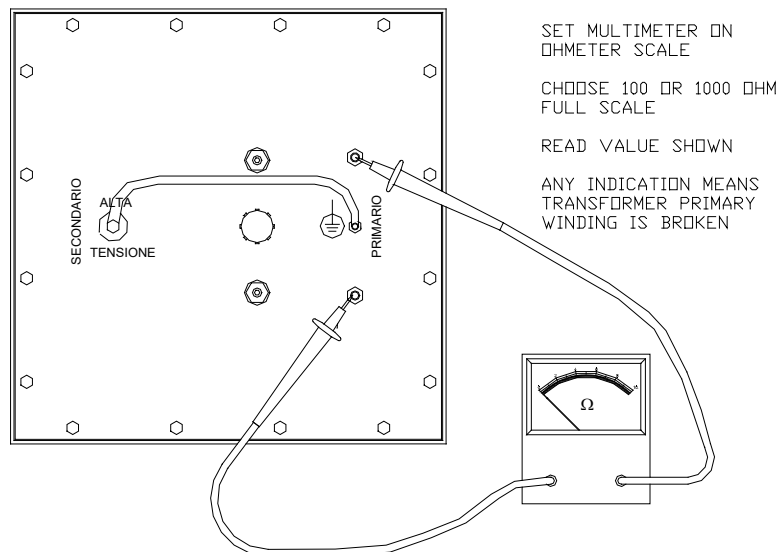
**CAUTION!!!** The following tests should only be carried out by a competent person.

**CAUTION!!!** Turn off the main power line to the generator and disconnect the high voltage transformer cable from the generator (X1M)

Disconnect high voltage cable, make a bridge between the primary winding terminals as shown and take the ohmmeter reading



Disconnect the power supply wires from primary winding terminals, make a bridge between the high voltage terminal and ground as shown then take the ohmmeter reading.



# Maintenance

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To ensure the trouble free operation of your corona treater some regular maintenance is required. This will extend component life and lead to less down time.

## **! Warning !**

The voltages inside the corona treater can exceed 10,000 volts; the generator must therefore be switched off & isolated from the mains supply before any work is carried out on the corona treater or generator.

Ceramic electrodes and electrode rollers can reach temperatures in excess of 150 °C during operation. Any work inside the corona treater station should only be carried out after the electrodes have had time to cool. The corona must be stopped and the extraction fan left running for approximately 5 minutes before any work commences.

If in any doubt contact Corona Supplies service department for assistance

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## Power Supply

### **EXHAUST / COOLING FANS / FILTERS**

Fans and filters should be kept clean to ensure the power supply does not overheat

<b>MONTHLY</b>	<b>6 MONTHLY</b>
Check filters are clean. Remove any contamination with a vacuum or remove the filter media from its housing and blow out contamination with a compressed airline.	Check exhaust / cooling fans are rotating freely. Fans that are “noisy” or rotating slowly should be replaced.  Remove any build up of contamination from inside the power supply enclosure using a soft brush or compressed airline.

### **SUGGESTED SPARE PARTS**

We would suggest you keep a minimum stock of parts that normally are subjected to wear (or easily damaged), to quickly solve any maintenance issues.

Part #	Description	Quantity
A.955000024	F1-F4 Fuse 2A	4
A.955000071	F5 Fuse 4A	1
A.954000000	Exhaust / Cooling Fan $\varnothing$ 150 x 38	1
A.954000002	Exhaust / Cooling Fan $\varnothing$ 120 x 38	1
A.968000078	GP1 IGBT Module	1
A.950000601	G2D IGBT Driver PCB	1
A.950000910	GDM2 IGBT Driver Control PCB	1
A.950000704	G3ST Power Supply PCB	1

## Warranty & Aftersales Service

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All our products are warranted for 12 month from invoice date within the underwrite conditions:

Complete replacement of any mechanics or electrics parts not properly functioning.

**This replacement will be accomplished only to the following condition:**

- a)** We are quickly informed by phone or email about a fault on our machinery, specifying equipment plate data and if possible component characteristic and identifier.
- b)** The faulty and/or malfunctioning material to be returned to our office within 30 days from receiving new spare parts. If within this time we don't receive the faulty part we will be obliged to charge the required.
- c)** Will be verified by our technicians that the component is truly faulty. Otherwise if the damage is caused by improper equipment use or there is evidence of tampering with tools and/or unauthorized personnel or the equipment has not been used in accordance with the instruction manual, we will not be liable for damages and parts will be charged.
- d)** The freight will be charged to customer.

**The warranty doesn't cover technician's costs for replacement and/or spare parts installation supplied, so this cost will be charged and invoiced in the usual way.**

**THIS EQUIPMENT WAS SUPPLIED TO YOU BY:**



**Corona Supplies Ltd**  
for all your corona needs

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**FOR FURTHER ASSISTANCE, PARTS OR SERVICE  
PLEASE CONTACT US IMMEDIATELY**

**THANK YOU**