MPS610V Power Supply with Unicable

Customer Product Manual
Part 1074164-02
Issued 1/20

Obsolete

To order parts call 866-885-1212.
For technical support call 800-524-1322.

This document is available on the Internet at http://emanuals.nordson.com/finishing

---

NORDSON CORPORATION • AMHERST, OHIO • USA

Obsolete

Address all correspondence to:

North American Sales and Service

Nordson UV Systems Inc.

300 Nordson Drive
Amherst, OH 44001
United States

Tel: (440) 985-4592
(800) 717-4228

Fax: (440) 985-4593

Email: uvcuring@nordson.com

Website: www.nordson.com/uvcuring

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

Notice

This is a Nordson Corporation publication which is protected by copyright. Original copyright date 2004. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Nordson Corporation. The information contained in this publication is subject to change without notice.

Trademarks

Nordson and the Nordson logo are registered trademarks of Nordson Corporation.

CoolWave is a trademark of Nordson Corporation.

© 2007 Nordson Corporation

Table of Contents

Obsolete

© 2007 Nordson Corporation

Obsolete

© 2007 Nordson Corporation

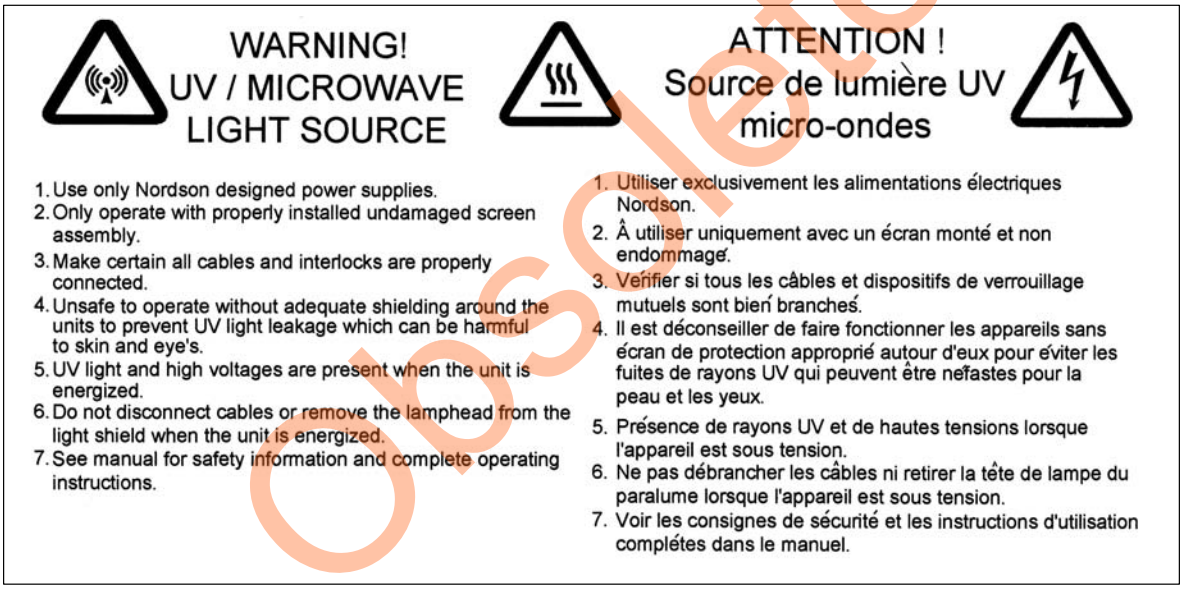
Section 1
Safety

Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

All equipment is designed and manufactured to International Safety Standards to ensure that the health and safety of the operator is protected at all times.



1500136A

Figure 1-1 Microwave UV Warning

Obsolete

© 2007 Nordson Corporation

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Nordson ultraviolet (UV) equipment is intended specifically for integration into other machines and should **NOT** be operated as a standalone system or without appropriate safety guarding, shielding, and interlocks. It is the responsibility of the integrator and end user to ensure that the final assembly fulfills all necessary legislation and is completely safe before operation.

This equipment is designed for the accelerated curing of UV inks, adhesives, and coatings. Do not use this equipment to cure alternative materials unless approved by the material supplier.

The equipment is not flame or explosion proof and is not designed for use in hazardous areas.

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include:

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards, shielding, or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings
- using equipment in hazardous areas

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Currently there are two organizations that set recommended guidelines for exposure to occupational microwave radiation exposure, OSHA (U.S. Department of labor, Occupational Safety and Health Administration - Directive 29cfr 1910.97) and ANSI (American National Standards Institute - Directive C95.1-1982). The ANSI directive, which is more stringent and most commonly referred to, states that individuals should not be exposed to microwave radiation levels above 5 mW/cm^2 at 2.45 GHz on a continuous basis.

Obsolete

© 2007 Nordson Corporation

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, light shields, doors, and/or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials. Always use recommended personal protection devices.
- Make sure the UV area is adequately ventilated.
- The UV equipment runs at extremely high temperatures. Do not touch the UV lamphead face during operation or immediately after shutting off the equipment.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.
- Always wear safety glasses that offer UV protection.
- Never expose any part of the body to direct or indirect UV light.

Ultraviolet Radiation

WARNING: Ultraviolet light is a form of electromagnetic radiation and can be harmful if exposure exceeds recommended levels. Protect eyes and skin from direct exposure to UV light. All equipment or areas where UV light is used must be adequately guarded, shielded, and interlocked to prevent accidental exposure.

Ultraviolet light is not capable of penetrating into the body and interacting with internal tissues and organs.

The National Institute for Occupational Safety and Health (NIOSH) document *Criteria for Recommended Standard... Occupational Exposure to Ultraviolet Radiation* (PB214 268) establishes guidelines for safe use.

See Figure 1-2. Ultraviolet light is divided into wavelength bands A, B, C, and V along with vacuum UV. Although values for wavelength bands will vary depending on the source, the following ranges may be used as a guide.

- Vacuum UV (100-200 nanometers) - absorbed by air and poses no danger to humans.
- UV-A (315-400 nanometers) - represents the largest portion of UV energy and is most responsible for human skin aging and increased pigmentation. UV-A is at the lower limit of sensitivity to the human eye. Referred to as far UV.
- UV-B (280-315 nanometers) - most responsible for reddening and burning of the skin and damage to the eyes.
- UV-C (200-280 nanometers) - filtered by ozone. Referred to as near UV.
- UV-V (400-450 nanometers) – visible UV

Exposure to UV radiation can result in

- reddening of skin
- headaches
- sore eyes

Obsolete

© 2007 Nordson Corporation

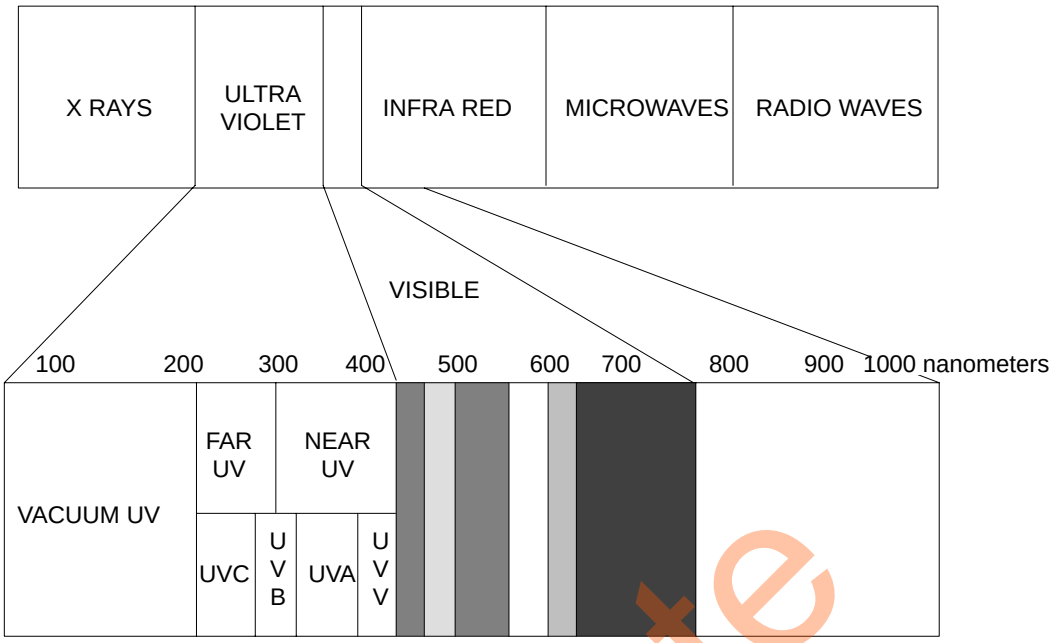


Figure 1-2 Ultraviolet Light Wavelength Bands

It is very important that all precautions are taken to prevent all UV light, whether direct or indirect, from escaping the curing area. Exposure to UV light can be harmful to both eyes and skin. Use the following table to determine the permissible exposure time to UV light on unprotected eyes or skin.

Permissible Ultra Violet Exposures as Recommended by the American Conference of Government and Industrial Hygienists	
Duration of Exposure (Per Day)	**Effective Irradiance (E Micro Watts/cm sq)**
8 hours	0.1
4 hours	0.2
2 hours	0.4
1 hour	0.8
30 minutes	1.7
15 minutes	3.3
10 minutes	5.0
5 minutes	10
1 minute	50
30 seconds	100
10 seconds	300
1 second	3000

First Aid

Store-bought creams, lotions, or aloe can be applied to affected areas of the skin. Seek immediate medical attention for skin burns and direct UV exposure to the eyes.

Microwave Radiation

The lamp system utilizes high powered RF microwave energy generated by a magnetron to provide power to the UV lamp. This technology is identical to that of residential microwave ovens and like these ovens can be dangerous if misused. The lamp system is safe provided that the RF screen and gasketing are intact. Any damage such as rips or holes in the screen may cause leakage of dangerous amounts of microwave radiation. The power to the lamp is interlocked to the RF detector and will shut down if microwave leakage in excess of 2 mW/cm^2 is detected. Any excessive leakage will cause the system to shutdown and the RF Detector fault will illuminate on the front of the power supply.

Obsolete

© 2007 Nordson Corporation

Ozone Gas

Ozone (O_3) is a colorless gas that is generated by the reaction of short-wave UV light (around 200-220 nanometers) with air, and it occurs whenever high-energy electrical discharge is present.

Ozone readily reverts to breathable oxygen when mixed with atmospheric air. Ozone should be removed from the UV source via a sealed duct and discharged to atmosphere according to local regulations. The discharge location should be away from pedestrian walkways and window openings and should be well above the average human breathing height for the area.

Regular ozone checks should be carried out every three months using an ozone meter. Recommended levels of ozone in the atmosphere of a factory should not exceed 0.1 parts per million (PPM). This level is easily obtainable if factory recommended exhaust rates are followed.

Ozone has a very distinct, strong odor even at low levels. Immediate ozone checks should be made if an operator can smell ozone. Most people can smell ozone at about one third the maximum allowable 0.1 PPM level.

Ozone exposure will cause headaches and fatigue. It will also irritate the mouth and throat. Overexposure can lead to respiratory infections.

If ozone is detected,

1. Shut down the UV system.
2. Check exhaust ducting for leaks.
3. Check the operator working area with an ozone meter.

If a person is overcome by ozone,

- Move the individual to a warm uncontaminated atmosphere and loosen tight clothing at the neck and waist.
- Keep the individual at rest.
- If the person has difficulty breathing, oxygen may be administered provided that suitable apparatus and a trained operator are available.
- If breathing is weak or has ceased, artificial respiration should be started.
- Seek medical assistance.

High Temperature

UV curing systems generally run at extremely high temperatures. A sudden shock from touching a high temperature surface might cause an operator to jump or take his attention away from other potential hazards.

When shutting down UV equipment for maintenance, allow the equipment to cool before beginning work, or wear protective gloves and clothing to prevent burns.

High Voltage

The UV curing equipment operates at high voltages up to 5000 Vdc. The system uses high-voltage, self-discharging capacitors. **Once power to the power supply is shut off, the capacitors need 120 to 130 seconds to discharge.**

If any electrical faults develop, the operator should:

1. Switch the equipment off immediately.
2. Make no attempt to service the equipment.
3. Call a qualified electrician, trained to service this type of equipment.

Obsolete

© 2007 Nordson Corporation

Mercury Bulbs (Lamps)

The bulbs used in UV lamp systems contain mercury under medium pressure. Mercury is a toxic substance and must not be ingested or come into direct contact with the skin. Under normal UV operating conditions, mercury presents no hazard as it is completely contained in the sealed quartz tube of the bulb; however, it is strongly recommended that protective gloves and eye protection be worn when handling UV bulbs.

These precautions should be followed when disposing of UV bulbs:

- Place the bulb in a rigid protective carton.
- Dispose of used bulbs through a local mercury recycling center.
- Wash your hands if a bulb breaks: mercury could come into contact with your skin.
- Do not store or handle bulbs near food or beverages.
- Nordson Corporation will dispose of UV bulbs free of charge provided the customer covers all shipping costs associated with returning the bulbs. For bulb disposal, please clearly mark on the all bulb containers AND shipping packages BULBS FOR DISPOSAL ONLY

Bulbs should be shipped to:

Primarc
Bulb Disposal Department
2 Danforth Drive
Easton, Pennsylvania 18045

UV Curable Inks and Products

Some materials used in UV curable inks, adhesives, and varnishes are toxic. Before handling them, read the Material Safety Data Sheets provided by the manufacturer, use the recommended personal safety equipment, and follow the recommended procedures for safe use and disposal.

Fire Safety

Under proper operating conditions, the surface temperature of the bulb is anywhere between 700-900 °C (1300-1700 °F), and the vapor gas inside the bulb is several thousand degrees Fahrenheit.

Any form of flammable material (such as paper, lint, powder, or dirt) trapped under the lamp, within the lamp housing or in the lamp's vicinity, will result in an increased risk of fire.

To avoid a fire or explosion, follow these instructions.

- Know where emergency stop buttons, shut-off valves, and fire extinguishers are located.
- Clean, maintain, test, and repair equipment according to the instructions in this manual.
- Always keep a fire extinguisher approved for electrical equipment near the unit.

Should a fire occur, the operator must:

1. Switch the equipment off immediately.
2. If possible, put out the fire with a fire extinguisher.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

1. Disconnect and lock out system electrical power.
2. Identify the reason for the malfunction and correct it before restarting the system.

Obsolete

© 2007 Nordson Corporation

Safety Precautions While Servicing

A qualified competent electrician must carry out all electrical maintenance and servicing of this equipment.

WARNING: This equipment operates at high voltages up to 5000 volts dc and is therefore potentially dangerous. The electrician servicing this equipment must take all precautions.

WARNING: Isolate the equipment at the main, disconnect or lockout before removing any of the cover panels

Control System Cleaning

Keep all contactors and relays clean and free from dirt and dust. Check these regularly, particularly in extremely dusty or powder-charged working rooms.

High Voltage Connections

Check the high voltage connections within the equipment carefully to make sure that these do not become dirty or coated with powder or other possible conducting material. Clean them regularly, at least whenever the lamp is changed, possibly more often where a particularly heavily polluted atmosphere occurs.

Always make sure the unicable connectors are secure and tight before applying power.

Cabinet Cooling

Check the cabinet cooling fan at least weekly and keep clear of any material that might clog or stop its operation. The power supplies run warm and keeping them cool with proper ventilation will prolong their life.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Moving and Storage

Moving or storing of the Nordson UV curing system must comply with all applicable local and state regulations. All electrical power and other services must be disconnected and the lamp head must be cool before moving or storing this equipment. Power supplies should be properly attached or fastened to an appropriate fixture such as a pallet for handling and storing. Due to the power supply's weight, it is recommended a mechanical device be used for handling and they should be kept as low to the floor as possible. It is recommended that the bulb be removed from the lamp head and stored or shipped in the original shipping tube. The lamp head and power supply should be shipped and or stored in the original container or an equivalent and kept dry and clean at all times.

Shipping of Nordson UV curing systems and their component parts must be done in accordance with all applicable shipping regulations including requirements for shipping of magnetic materials and mercury lamps.

Safety Symbols

The following safety symbols are used in this manual. The symbols are used along with warnings to help you operate and maintain your equipment safely. Pay attention to all warnings and follow directions to avoid personal injury.

WARNING: Mechanical or combined mechanical/electrical hazards.

WARNING: Electrical hazard

WARNING: Ultra violet light hazard

WARNING: Burn hazard

CAUTION: Equipment hazard

Obsolete

© 2007 Nordson Corporation

Obsolete

© 2007 Nordson Corporation

Section 2
Description

Introduction

The MPS610V power supply is used with the Nordson CoolWave ultraviolet microwave applied curing system with a CW610 lamphead.

The power supply unit provides the high voltage supply for the lampheads and a control circuit to interlock the lampheads with the curing machine.

What is UV Curing?

Ultraviolet curing is achieved by a chemical reaction in special inks and coatings when intense UV energy is focused on them. Curing efficiency depends on UV power, coating weight, operation speed, type of substrates, material chemistry, and other factors.

The UV Curing System

The system is designed to cure UV inks, adhesives, and coatings for numerous industrial applications.

The system consists of an individual 10-in. lamphead, a corresponding variable output power supply, and an RF detector. Additional lampheads can be lined up end-to-end to form longer curing widths.

Figure 2-1 and Table 2-1 illustrate and describe the major components of a typical setup for a CoolWave ultraviolet microwave applied curing system. Your system may appear different depending on your application requirements.

How Does it Work?

A microwave generator (magnetron) operating at 2400 to 2500 MHz is used to excite a medium pressure mercury bulb installed in a lamphead. Ultraviolet light between 220 and 470 nanometers is emitted.

Microwave energy from a magnetron is directed into a cavity containing the UV bulb. A screen located at the opening of the cavity allows the UV light to pass through while the microwave radiation is contained.

In addition to ultraviolet light, the high-energy bulbs radiate heat. Therefore, a cooling system is incorporated to take away the excess heat and make sure that the bulbs and housings remain at an acceptable operating temperature.

The unit is fitted with interlocks and safety faults that prevent the operation of the system in an unsafe condition and indicate any faults that might occur on the front panel of the power supply.

Light shielding is required to ensure the stray UV light and heat meet agreed safety criteria.

Obsolete

© 2007 Nordson Corporation

System Components

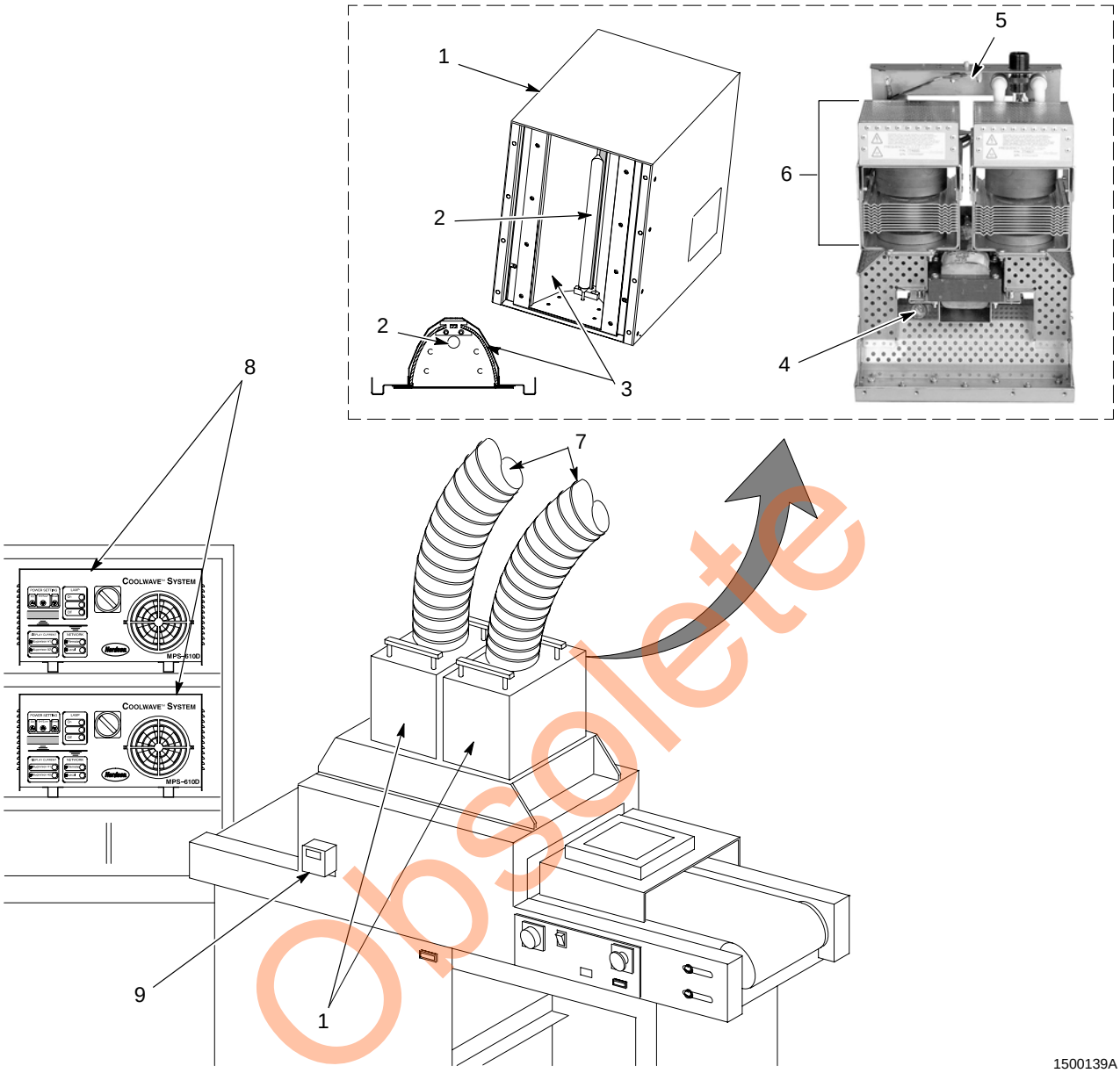
Refer to Table 2-1 and Figure 2-1 for a description of the system components.

Table 2-1 System Components

Item	Component	Description
1	Lamphead	The lamphead consists of a bulb housing, UV bulb (2), wave guide, reflectors (3), light detector, starter bulb (4), and the magnetron (6) assembly. The patented wave guide also couples RF energy to the bulb and provides cooling for the bulb. The lamphead reflects the emitted UV light onto the substrate.
7	External Blowers for Cooling	External blowers are used to cool the UV bulb and magnetron. The lamphead requires approximately 350 CFM at 7 in. W.C. of cooling air per lamphead in order to function properly. The external blowers must be sized appropriately to provide adequate cooling. **NOTE**: Lampheads with external blowers require a device to monitor the air flow and static pressure. In the event of cooling air loss the device will shut the system down.
8	Power Supply	The power supply is fully modular. One power supply must be provided for each lamphead. The power supply can operate as a standalone system or part of a Master/Remote circuit.
9	RF Detector	An RF detector monitors microwave energy levels. The system will shut down when RF levels above 5mW/cm^2 are measured. Systems operated as standalone units require one RF detector per power supply unit. If multiple systems are networked then the master power supply unit must be connected to one RF detector.

Obsolete

© 2007 Nordson Corporation



Obsolete

Figure 2-1 System Components (Typical UV Curing System Setup)

1. Lampheads
2. Ultraviolet bulb
3. Reflectors
4. Starter bulb
5. Pressure switch
6. Magnetrons
7. Tubing to external blowers for cooling
8. Power supplies
9. RF detector

© 2007 Nordson Corporation

Obsolete

© 2007 Nordson Corporation

Section 3
Installation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Inspection and Packaging

The Nordson CoolWave system has been carefully tested, inspected, and packaged prior to shipping. Upon receipt, inspect the shipping materials and components for visible damage. Report any damage immediately to the shipper and to the Nordson UV systems engineering department.

NOTE: When opening the packaging, please take care so that the packaging can be re-used to ship the unit to the next destination. Keep all packaging materials together and in a location where they will not get damaged.

Mounting Guidelines

WARNING: Heavy equipment. Be careful when moving the power supply.

Power Supply

See Figure 3-1 for power supply dimensions and clearance requirements.

- The power supply can be mounted on any horizontal surface.
- Power supplies can be stacked up to five units high but due to the weight of each unit (approximately 230 lb) it is recommended that they be stacked so they can be easily accessed for service.
- Leave at least six inches of ventilation clearance on all four sides of the power supply unit.
- Blowers are mounted on the front and the rear of the power supply and need to be free and clear of any obstructions.

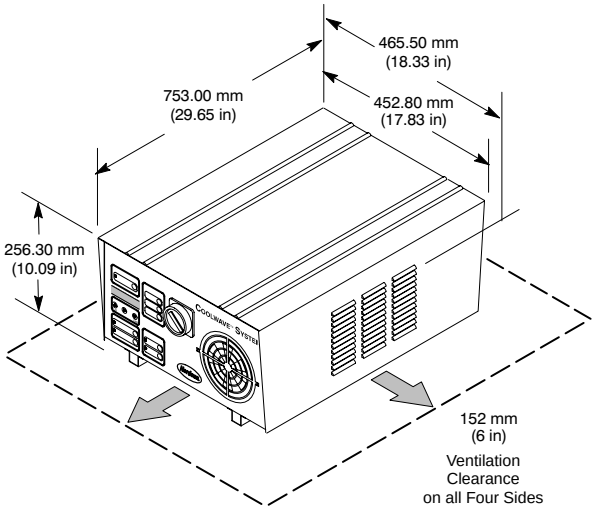


Figure 3-1 Power Supply Dimensions

Obsolete

© 2007 Nordson Corporation

RF Detector

See Figure 3-2.

- One RF detector is normally required for every 16 networked units within one curing enclosure. However, some applications and systems may require a RF detector on each unit. Contact your Nordson representative for more information.
- Mount the RF detector so that the antenna faces the lamphead screen and is between the operator and the lampheads or the lampheads and any opening (the major source for RF leakage).
- The minimum distance should be eight inches to prevent excessive heat on the detector surface.
- Do not mount the RF detector directly below the lamphead.
- For RF detector connections, refer to *RF Detector* on page 3-10.

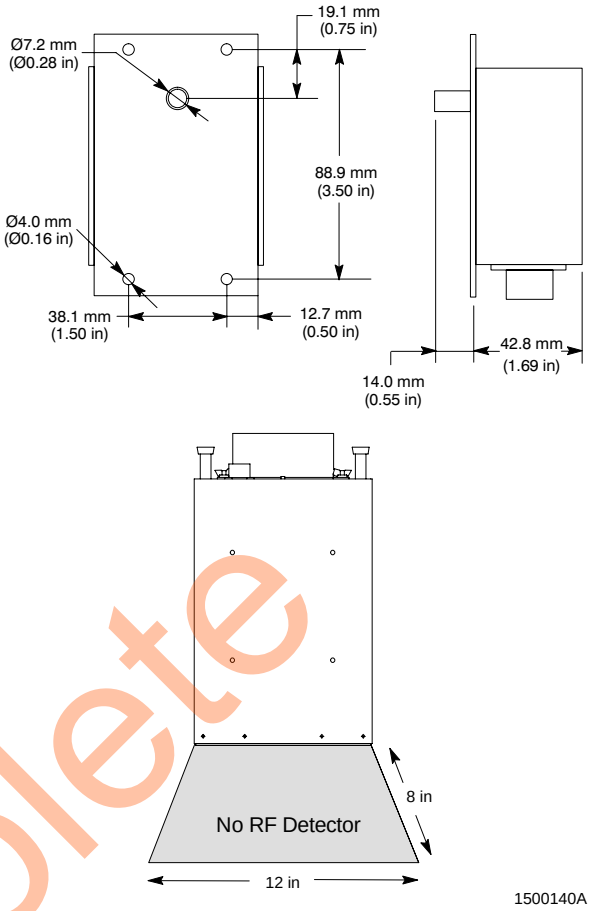


Figure 3-2 RF Detector

Lamphead Cooling

Lamphead cooling is critical to the operation of the lamphead. The CW610 requires an external source of cooling air ducted to each lamphead.

The following specifications must be maintained for all applications at all times regardless of which type of lamphead is used:

- unimpeded and unrestricted flow of cooling air through the lamphead
- constant static pressure of 7-in. water column from the inside of the lamphead to ambient or the lamp face
- 350 CFM of airflow through the lamphead
- Minimum vent/extraction air of 450 CFM at 2-in. W.C.

If you are using an exhaust box or any other type of lamp face attachment that can impede the airflow through the lamphead, you must monitor the pressure and CFM on the lamp face.

The cooling air flow, static pressure, and CFM requirements must be maintained. If not, the life lamphead will be greatly reduced with the possibility of failure.

For more information on lamphead cooling, contact your Nordson UV representative.

Obsolete

© 2007 Nordson Corporation

Electrical Installation Guidelines

Power Line Connections

Refer to Table 3-1. This unit is designed to accommodate a broad range of power line voltages found around the world for both 50 and 60 Hz. The power line input is three phase. The transformer taps must be changed to select the operating voltage range. The power supplies are designed to operate at +/- 10% of the normal voltage for a given tap setting. Only the taps on the two identical power transformers need to be changed.

Table 3-1 Transformer Taps

Normal Voltage	Voltage Range	Transformer Tap
480 +/- 10%	432-528	480
440 +/- 10%	396-484	440
380 +/- 10%	342-418	400

Input Power Configuration

Refer to Table 3-2. Current ratings indicate current demand during normal full-power operation. Size supply wiring and circuit breakers or fuses to allow for heavy current draw during startup.

Table 3-2 Current Draw

Line	60 Hz		50 Hz	
	Amps @ 440 Vac	Amps @ 480 Vac	Amps @ 380 Vac	Amps @ 400 Vac
L1	13	12	16	15
L2	21	18	25	23
L3	13	12	16	15

Obsolete

Power Source

The customer power source must be wired in accordance with either the National Electric Code, Part I or the Canadian Electrical Code, Part I, or local codes.

Connector P1 on the power supply is for three-phase input power. A 600 Vac, 30 Amp twist lock connector is supplied with the system for the power input.

Measure the incoming power source voltage from the main power supply. Make sure that the power source voltage matches the transformer tap settings.

Environmental Operating Conditions

Condition	Specification
Altitude	Up to 2000 meters (6561 ft)
Temperature	5-40 °C (41-104 °F)
Rh	80% up to 31 °C (88 °F), decreasing lineraly to 50% at 40 °C (104 °F)

© 2007 Nordson Corporation

Network Connections

NOTE: Equipment must be connected in accordance with the NEC and local wiring codes.

The power supply can be configured to form a network of up to 16 systems. The entire network can be operated either from the master control unit front panel or from a remote source.

Network Connectors IN1 and OUT1

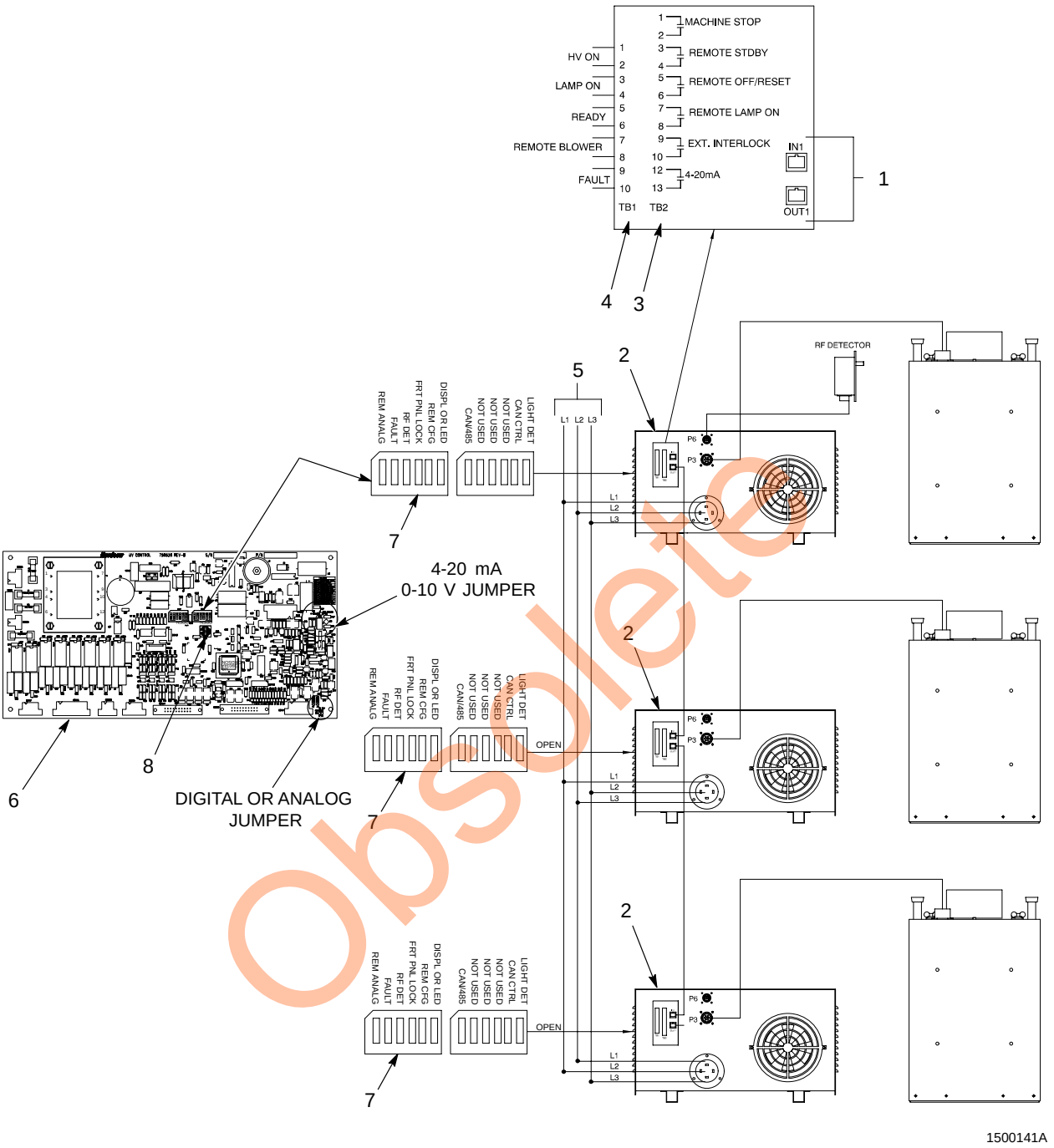
Refer to Figure 3-3 and Table 3-3. Use the IN1 and OUT1 connectors (1) (shielded RJ45) to connect multiple units in a Master/Remote fashion. The connection cable is commercially available and should have a rating of CAT3 or higher. Repeat this for each unit

Table 3-3 IN1 and OUT1 Network Connectors

Cable	From	To	Length (ft)	Part
Network	OUT1 connector of a unit	IN1 connector of the next unit	6	775031
Network	OUT1 connector of a unit	IN1 connector of the next unit	4	1071854

Obsolete

© 2007 Nordson Corporation



1500141A

Figure 3-3 Connections and Switch Settings

1. Network connectors IN1 and OUT1
2. Power supply
3. Input connector TB2
4. Output connector TB1
5. Power lines
6. Main control board
7. DIP switches
8. Rotary address switch

Note: **Correct dip switch settings for the main control board are located in Tables 3-9 through 3-13.**

Note: Refer to Figure 3-7 for a photograph of main control boards manufactured before August 2004.

Obsolete

© 2007 Nordson Corporation

Output Connector TB1

Refer to Table 3-4 and Figure 3-3.

All outputs from the TB1 output connector (4) are isolated normally open relay contacts and are rated at 240 Vac, one amp maximum.

Table 3-4 Output Connector TB1 Pin Assignments

Pin	Function	Description
1, 2	High Voltage ON	Contact closes when high voltage is applied to the magnetrons.
3, 4	Lamp ON	Contact closes when the light sensor has detected light output from the lamphead (after 10-15 seconds).
5, 6	System Ready	Contact closes after the power supply unit has been turned on and the light detector senses light output. In a networked system all power supply units have to be turned on and all lamphead detectors sense output.
7, 8	Remote Blower	This output contact closes when the lamphead is placed in Standby or On. Please note the contact is only rated for one amp @ 240 Vac.
9, 10	Fault Output	Contact closes whenever there is a fault present on the system.
11, 12	Not Used	

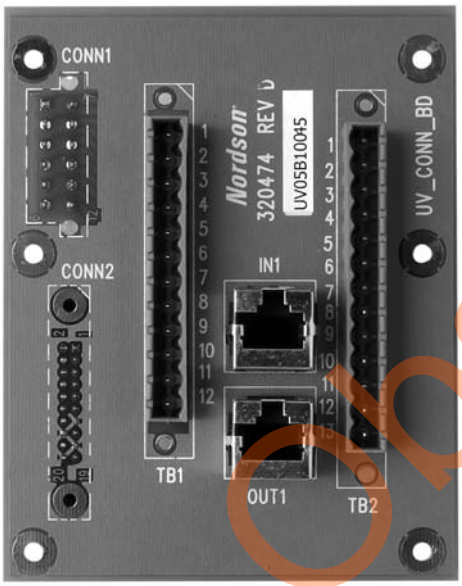


Figure 3-4 Output Connector TB1 and Input Connector TB2 - Located on the Rear Panel of the Power Supply

Obsolete

© 2007 Nordson Corporation

Input Connector TB2

Refer to Table 3-5 and Figure 3-3.

The inputs from the TB2 input connecter (3) are designed for contact closure or an open collector output. With the exception of the 4-20 ma remote analog input, the input terminal voltage is 24 Vdc and will source about 8 ma.

Table 3-5 Input Connector TB2 Pin Assignments

Pin	Function	Remote	Local	Description
1	Common	X	X	If this input is not interfaced to external equipment, a jumper must be installed. Opening this input shuts down the power supply unit, sets the FAULT output, and causes the F STOP fault message to appear on the display.
2	Machine Stop			
3	Common	X	NA	Remotely controls the power supply unit when operating in the Remote mode. A pulse or momentary contact closure to this input places the power supply unit in the Standby mode. (The Off/Reset contact must be closed)
4	Remote Standby			
5	Common	X	NA	Remotely controls the power supply unit when operating in the Remote mode. This contact must be closed for the lamphead to be turned on. Opening the contact will turn the lamphead off and will clear a fault condition.
6	Remote Off/Reset			
7	Common	X	NA	Remotely controls the power supply unit when operating in the Remote mode. A pulse or momentary contact closure to this input turns the CoolWave lamphead to the on state. (The Off/Reset contact must be closed). The Off/Reset contact must be opened to turn the lamphead off.
8	Remote Lamp On			
9	Common	X	X	If this input is not interfaced to external equipment, a jumper must be installed. Opening this input shuts down the power supply unit, sets the FAULT output, and causes the F LOCK fault message to appear on the display.
10	External Interlock			
11	Chassis Ground	X	X	Not Used
12	4-20 ma input or 0-10 Vdc	X	NA	Remotely varies the lamphead output power when the unit is in the Remote mode. The lamphead power varies from 25% to 100% power up to the front panel SETPOINT as the input current is varied from 4-20 ma or 0-10 Vdc. **NOTE:** If this input is used to vary the lamphead power and the current drops below about 3 ma, the lamphead power becomes the SETPOINT power. If remote variable power is not required, leave these terminals disconnected. Reversing the ground and signal wires can cause erratic system operation.
13	4-20 ma input or 0-10 Vdc (ground)			

Obsolete

© 2007 Nordson Corporation

Remote Power Level Control

The 4-20 ma power level control can be modified to a 0-10 volt power level control if required. Contact your Nordson UV curing representative for more information on this conversion.

Lamp Start-Up Timing Diagram for Remote Input Contact Closures

See Figure 3-5. The Off/Reset contact must be closed for the unit to go to **Standby** or **On**. Once the lamphead is put into the Standby or On mode the lamphead will remain in that mode until the Off/Reset contact is opened.

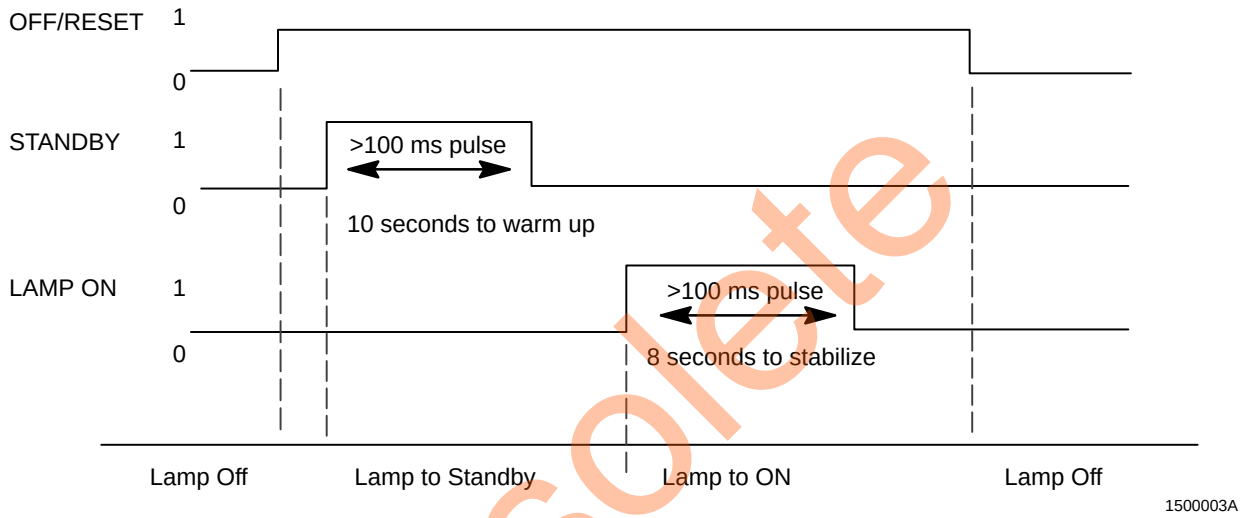


Figure 3-5 Lamp Start Up Timing Diagram for Remote Input Contact Closures

Obsolete

Rapid Startup

Use if your system will sit idle in the Standby mode before moving to the On mode.

1. On the LAMP selector of the host machine (or master control unit's lamp selector), press the Standby button. There will be an approximate 10 second warm-up time for the magnetron filament.
2. After the 10 seconds the system will go into standby and remain there indefintely.

   NOTE: Do not leave the power supply in the standby mode for longer than 30 minutes in an eight-hour period or more than 15% of the total lamp-on time. Prolonged standby periods will shorten the magnetron life.
3. Press the On button to enable the UV light. The light will turn on instantly but will take approximately 8 seconds to stabilize. After the 8 seconds, the system ready output contact (TB1) will close.

Standard Startup

Use to go directly through the warm-up to the On mode.

1. On the LAMP selector of the host machine (or master control unit's LAMP selector), press the LAMP On button.
2. During the next 10 seconds the unit will go through the warm up cycle before turning to On.
3. After approximately 8 more seconds the unit has stabilized and the system is ready to run. The system ready output contact (TB1) will close.

© 2007 Nordson Corporation

Cable Connections

See Figure 3-3.

CAUTION: It is important that the unicable connectors be completely engaged and tightened before turning on the lamp system. Failure to properly engage these connectors can result in damage to the UV system.

Before inserting plugs into receptacles check both the plug and receptacle and ensure that the rubber inserts are in good condition and not torn. Make sure also that there is no evidence of arcing on the pins and sockets.

The plug is keyed and can only be inserted into the receptacle when correctly oriented. Do not force the plug into the receptacle.

Push the plug into the receptacle as far as it will go, then start threading the screw ring onto the threaded portion of the receptacle. Continue to push on the plug while tightening the screw ring until the plug is firmly seated into the receptacle. Do not use the screw ring to pull the plug into the receptacle. In some cases, it might help to wiggle the plug slightly while pushing it into the receptacle to ensure that all the pins mate securely with the sockets.

See Figures 3-6 and 3-7. Each unicable connector end features an indicator that identifies when the connector is fully mated. Tighten the screw ring by hand. When fully mated, no red should appear on the indicator locations and the is no movement between the plug and the receptacle.

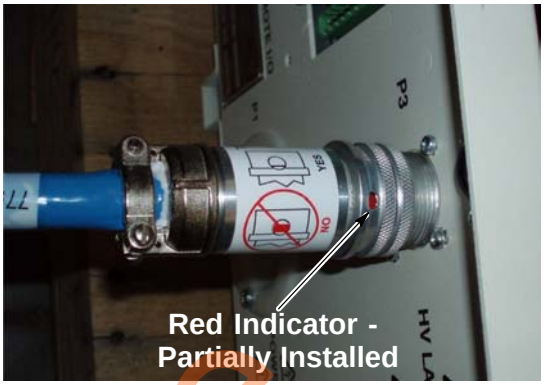


Figure 3-6 Unicable connector partially installed

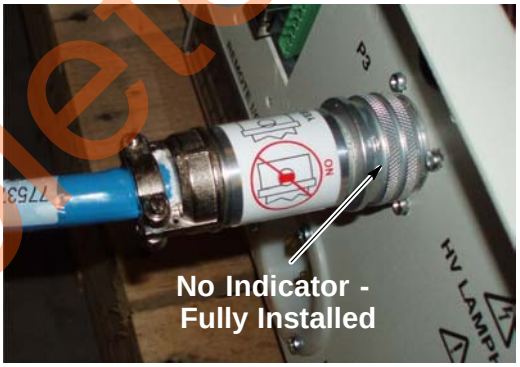


Figure 3-7 Unicable connector fully installed

Lamphead

Refer to Table 3-6.

Table 3-6 Lamphead Cable Connections

Cable	From	To	Length (ft)	Part
Unicable	Power supply unit connector P3	Lamphead	12	775374
			25	1059674
			50	775375
			75	755377
			100	775380

Obsolete

© 2007 Nordson Corporation

RF Detector

Refer to Table 3-7.

NOTE: Each network requires at least one RF detector. If there are multiple light-shielding chambers, at least one RF detector must be located in each chamber.

Table 3-7 RF Detector Connections

Cable	From	To	Length (ft)	Part
RF Detector	CoolWave power supply	RF detector	12	1061134
			25	775029
			50	775050
			75	775051
			100	775052

Obsolete

© 2007 Nordson Corporation

Main Control Board Standard Configurations

See Figures 3-8 and 3-9.

The following information identifies the standard switch configurations for the power supply unit. The systems may be configured to run as standalone or interconnected to form a complete networked system of up to 16 lamps.

NOTE: The main control board was changed in 2003. Figure 3-9 illustrates the previous control board.

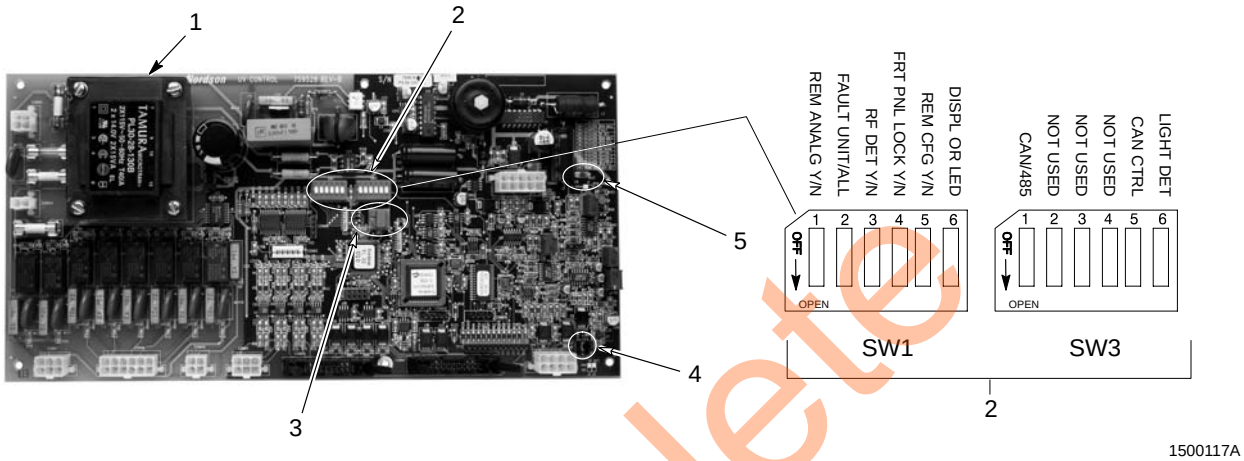


Figure 3-8 Main Control Board

1. Main control board
2. Dip switches
3. Power supply address switch
4. Digital/Analog jumper (light detector) (See Note)
5. 4-20 ma/0-10 Vdc jumper

Note: Digital/Analog jumper for light detector set to Digital for all single lamphead cable units.

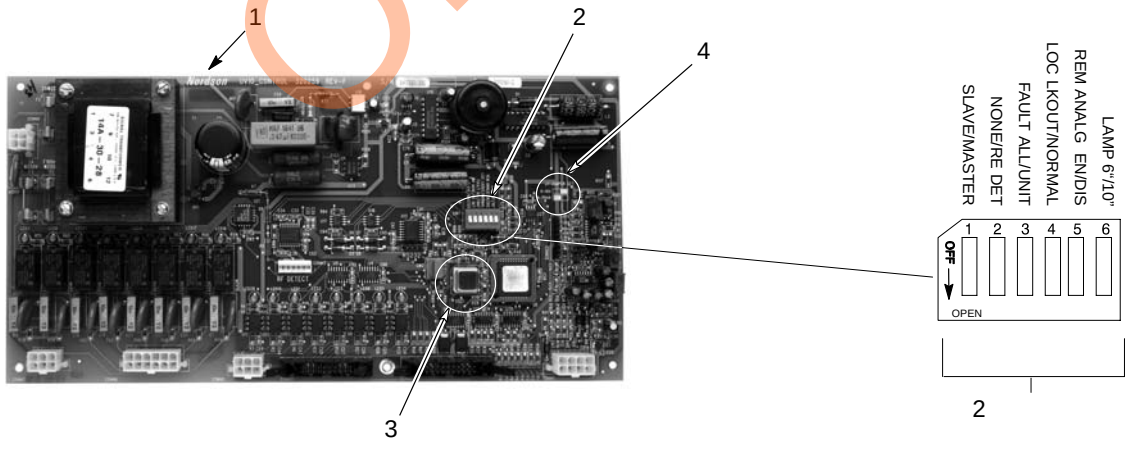


Figure 3-9 Main Control Board Manufactured before 2004

1. Main control board
2. Dip switches
3. Power supply address switch
4. 4-2 ma/0-10 Vdc Jumper

Obsolete

© 2007 Nordson Corporation

Control Board Dip Switches

There are two sets of dip switches (SW1 and SW3) that need to be set on the main board. Tables 3-8 and 3-13 provide an explanation of each switch.

NOTE: Switches 5 and 6 were added to control boards manufactured after 2002.

SW1 Control Board Dip Switches

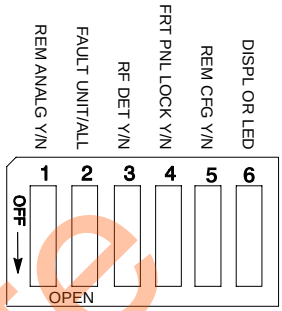


Figure 3-10 SW1 Dip Switch Configurations

Table 3-8 SW1 Control Board Dip Switches

Switch	Description	Function
1	Closed/On = Remote analog On Open/Off = Remote analog Off	Configures the remote adjustable power input to on or off. (TB2)
2	Closed/On = Fault individual units Open/Off = Fault all units	Configures the power supply (standalone or networked system) to shut down the individual lamp or the entire network in the event of a fault.
3	Closed/On = RF Detector is used Open/Off = RF Detector is not used	Configures the power supply unit to be operated with or without an RF detector. Standalone systems or master units cannot operate without an RF detector. An RF detector can be installed at each power supply when necessary. Networked systems are typically configured for the master unit to have one RF detector while its remote units (up to 16 units) do not. **NOTE:** Up to 16 units can be networked and operate with one RF detector but it is recommended that every six units have one RF detector.
4	Closed/On= Front panel controls Off Open/Off = Front panel controls On	Configures the front panel of an individual power supply to be enabled or disabled. When disabled, all operational functions must be controlled by the inputs or the network master.
5	Closed/On = Front Panel configuration On Open/Off = Front Panel configuration Off	Allows power supply configuration to be completed at the front panel.
6	Closed/On = Front Panel digital display Open/Off = Front Panel has LEDs only	Configures the control board for an LED only front panel or a number display on the front panel.

Obsolete

© 2007 Nordson Corporation

SW1 Dip Switch Configurations

Tables 3-9 through 3-12 detail the switch settings for the possible system configurations.

OPEN = Off (No)
CLOSED = On (Yes)

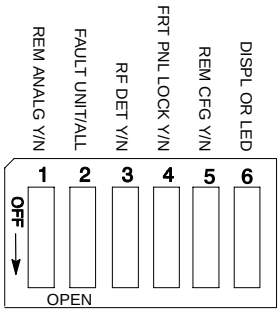


Figure 3-11 SW1 Dip Switch Configurations

Table 3-9 Single System Operating **Locally**

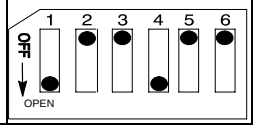
Power Supply	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	Suggested Settings
Standalone (Set Front Panel to: **Local**)	Rem Analog Open/OFF	Fault Open/OFF	RF Detector Closed/ON	Rem Only Open/OFF	Rem CFG Open/OFF = Disabled Closed/ON = Enabled	Display or LED Closed/ON = Num	

Table 3-10 Single System Operating **Remotely**

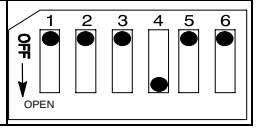
Power Supply	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	Suggested Settings
Standalone (Set Front Panel to: **Remote**)	Rem Analog Open/OFF	Fault Open/OFF	RF Detector Closed/ON	Rem Only Open/OFF = Disabled Closed/ON = Enabled	Rem CFG Open/OFF = Disabled Closed/ON = Enabled	Display or LED Closed/ON = Num	

Table 3-11 Networked System Operating **Locally**

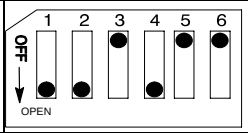
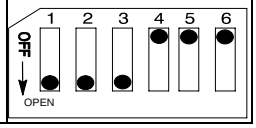
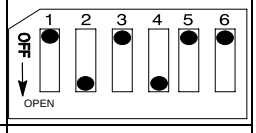
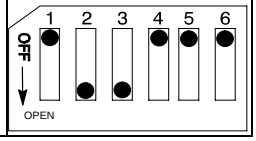
Power Supply	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	Suggested Settings
Master (Set Front Panel to: **Local**)	Rem Analog Open/OFF	Fault Open/OFF	RF Detector Closed/ON	Rem Only Open/OFF = Disabled Closed/ON = Enabled	Rem CFG Open/OFF = Disabled Closed/ON = Enabled	Display or LED Closed/ON = Num	
Remote (Set Front Panel to: **Local**)	Rem Analog Open/OFF	Fault Single = Closed/ON All = Open/OFF	RF Detector Yes = Closed/ON No = Open/OFF	Rem Only Open/OFF = Disabled Closed/ON = Enabled	Rem CFG Open/OFF = Disabled Closed/ON = Enabled	Display or LED Closed/ON = Num	

Table 3-12 Networked System Operating **Remotely**

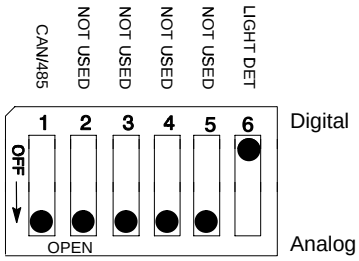
Power Supply	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	Suggested Settings
Master (Set Front Panel to: **Remote**)	Rem Analog Open/OFF	Fault Single = Closed/ON All = Open/OFF	RF Detector Closed/ON	Rem Only Open/OFF = Disabled Closed/ON = Enabled	Rem CFG Open/OFF = Disabled Closed/ON = Enabled	Display or LED Closed/ON = Num	
Remote (Set Front Panel to: **Remote**	Rem Analog Open/OFF	Fault Single = Closed/ON All = Open/OFF	RF Detector Yes = Closed/ON No = Open/OFF	Rem Only Open/OFF = Disabled Closed/ON = Enabled	Rem CFG Open/OFF = Disabled Closed/ON = Enabled	Display or LED Closed/ON = Num	

Obsolete

© 2007 Nordson Corporation

SW3 Control Board Dip Switches

Table 3-13 SW3 Control Board Dip Switches

Dip Switch	Description	Switch Settings
1	Closed/On = CAN Open/Off = 485	
2	OFF (Not used)	
3	OFF (Not used)	
4	OFF (Not used)	
5	OFF (Not used)	
6	Closed/On = Digital light detector in lamphead Open/Off = Analog light detector in lamphead	

Obsolete

© 2007 Nordson Corporation

Power Supply Address Switch (SW2)

See Figure 3-12.

The SW2 rotary address switch has positions 0 through 9 and A through F. The switch is used to set the electronic address of the power supply if it is part of a network.

When Remote Configuration (REM CFG) is Enabled or ON on the control board, the address must be set from the front panel.

When Remote Configuration (REM CFG) is disabled or OFF on the control board, the address must be set on the board.

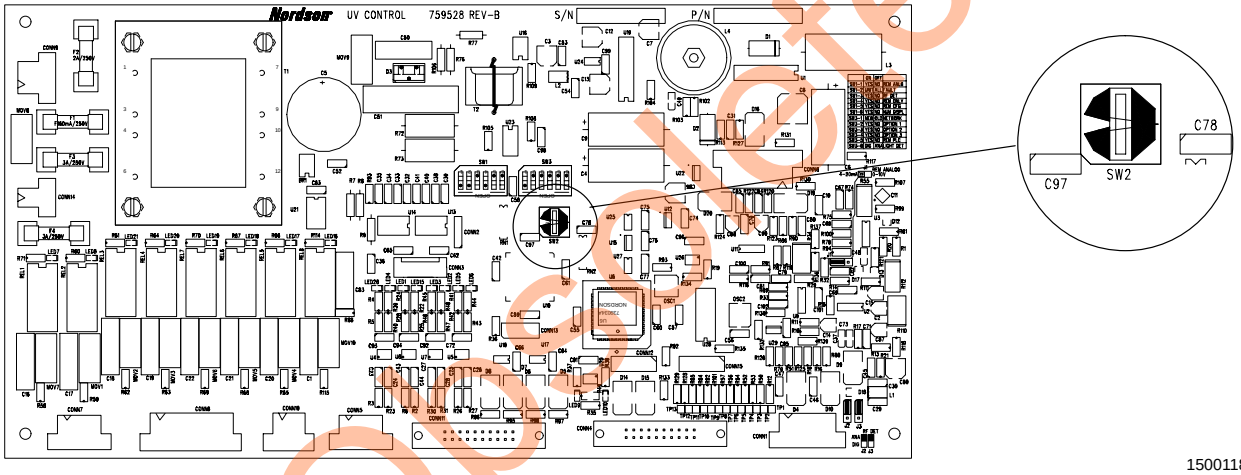
Standalone Units

When operating the power supply as a standalone unit (single) set the switch in the 0 position.

Networked Units

When operating the power supplies in a networked configuration (master/remote), you **must** set the rotary address switches as follows:

Unit	Rotary Switch Setting
Master	0
Remote(s)	any unique value
Example: Set the master to 0, remote 1 to 1, remote 2 to 2, etc.	



1500118A

Figure 3-12 Power Supply Address Switch on Main Control Board

Remote Configuration of Main Control Board

Remote configuration allows for easy user interface by using the front panel display and select buttons to change the configuration settings of the main control board. The main control board must have SW1 and SW3 dipswitches in order for remote configuration to be used.

To enable remote configuration:

- Set SW1-5 5 in the Closed/On position.
- If you are remotely controlling the output power of the lamphead (used on variable output power supplies only), set the jumper for 4-20ma or 0-10vdc now.

Configure the power supply (refer to Tables 3-14 and 3-15):

1. Connect input power to the power supply.
2. Place the front panel power switch to the ON position. The system display will go through a POWER UP TEST.

Obsolete

© 2007 Nordson Corporation

Table 3-14 Panel Display Function

Front Panel Button	Description
Magnetron #2/Local	Press simultaneously for 3-5 seconds to enter configuration menu
Set/Save	Set choice/Advance to next field
Up/Down	Allows field choice selection

3. Once the POWER UP TEST is complete, press the Magnetron 2 and Local buttons simultaneously for 3-5 seconds.
4. The display reads ID 00 or ID 01, 02, 03,etc.). Use the UP/DN button to set the configuration then press Set/Save to save the setting and advance to the next field.
5. The display reads FLT A or FLT U (Fault All or Fault Unit). Use the UP/DN button to set the configuration then press Set/Save to save it and advance to the next field.
6. The display reads RFD Y or RFD N (RFD Detector Yes or No). Use the UP/DN button to set the configuration then press Set/Save to save it and advance to next field.
7. The display reads NT 485 or NT CAN (CAN or 485 Network). Use the UP/DN button to set the configuration. Press Set/Save to save this configuration and advance to next field.
8. The display reads ANA Y or ANA N Analog Yes or No). Use the UP/DN button to set the configuration then press Set/Save to save it and advance to next field.
9. The last display will read PWROFF. Turn the Power Supply power switch to OFF position. This will set the flash configuration memory.

The remote configuration of the main control board is complete. From this point forward, you will not need to remove the power supply cover to configure the main control board.

Obsolete

Table 3-15 Configuration Options

Display	Function	Configuration 1	Configuration 2
ID 00..15	Sets master or slave power supply identification	Master = ID 00	Remote = ID 01..15
FLT	Sets Unit Fault to fault units separately or all together	Fault U = Fault Unit	Fault A = Fault All units
RFD	Sets RF detector for each power supply	RFD = Y (yes) (RFD is needed for master unit.)	RFD = N (no)
NT	Sets communication network for use with Master/Remote units	NT 485 = 495 protocol communication network **NOTE:** As of January 2005, only the NT 485 communication is active.	NT CAN = CAN BUS communication network
ANA	Sets remote input to power supply via I/O board connection	ANA Y = Y (yes) **NOTE:** If analog input is used to control the lamphead output, a jumper for 4-20 ma or 0-10 Vdc must be set on main control board.	ANA N - N (no)
PWROFF	Instruction to turn main power supply switch off	N/A	N/A

© 2007 Nordson Corporation

Section 4
Operation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

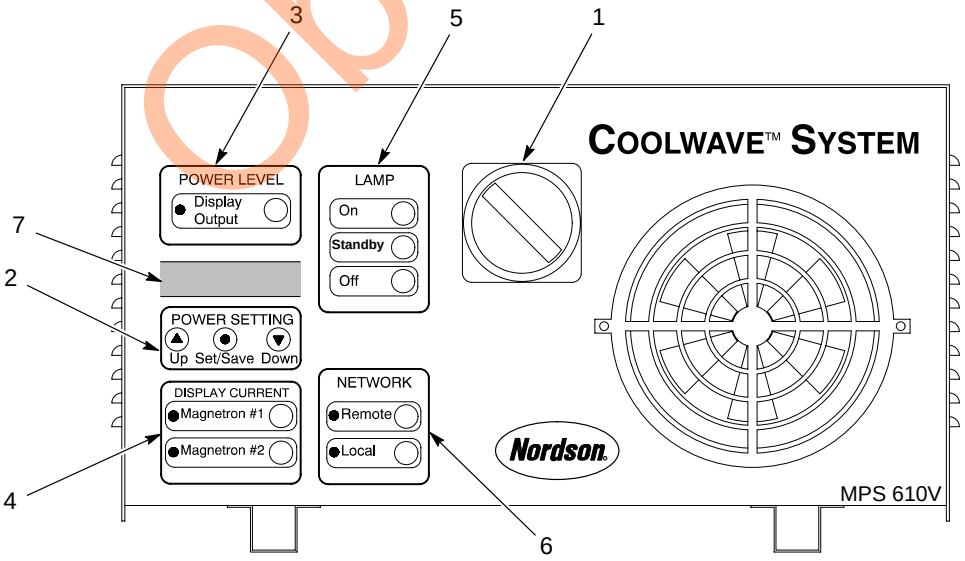
Introduction

Startup procedures will vary depending on how the system was integrated into other equipment. As a result, the startup procedures documented in this manual are strictly for the UV equipment.

Obsolete

Display and Controls

Refer to Figure 4-1 and Table 4-1.



1500006A

Figure 4-1 CoolWave System Displays and Controls

© 2007 Nordson Corporation

Display and Controls *(contd)*

Table 4-1 Displays and Controls

Item	Control	Description
1	Main Power Switch	Turns the main power on and off to the CoolWave system.
2	POWER SETTING	The system is factory set to operate at 100% output. To check the power level, press the Set/Save button. Change the output in 5% increments by pressing the up or down arrow buttons. Changes take place as soon as you press the up or down arrow button. Press the Set/Save button in order to save these changes. If the Set/Save button is not pressed the power will revert back to the last saved level when the main power is cycled.
3	POWER LEVEL/Display Output	Displays the percentage power output as controlled remotely and of the actual power level set on the unit.
4	DISPLAY CURRENT	Displays the current flowing to a magnetron. Press the button next to the appropriate magnetron to display that magnetron's current. To leave this display press the same button again.
5	LAMP	Off: Turns the lamphead off. Standby: Applies warm-up power to the magnetron filament and the message WARMUP appears in the display while warming up. Once it is warm, STDBY appears. On: Turns the lamphead on after magnetron filament is warm and LMPDLY is displayed and then LAMPON.
6	NETWORK	Sets system operation from the Local or front panel mode to a Remote or external device or controller.
7	Digital Display	Displays power levels, operation and fault messages.

Display Messages

During operation, the system displays messages that indicate the system operating status. Table 4-2 lists the display messages.

NOTE: Refer to *Magnetron Current* on page 8-2 for a chart comparing UV Output Wattage vs Remote Input Current/Voltage.

Table 4-2 Display Messages

Message	Description
OFF	The power is turned on to the power supply. The lamphead is in the Off mode.
WARMUP	The magnetron filament is energized. This message will be present for only the filament warm-up time period, which is about 10 seconds.
STDBY	The filament is warm and the unit is waiting for an On command.
LMPDLY	Lamp ON has been enabled. The power contactor is closed, and high voltage has been applied to the magnetrons. This message is present only for the lamphead warm-up period, which is about eight seconds.
LAMPON	Lamp is On at the set power level.
L COOL	Lamp was On and a Standby command has been received. The magnetron power is shut off and the contactor is open. This message is present only for the cool down period, which is about 30 seconds. The lamphead then goes to a standby state. The unit will not restart until the delay time expires.
C DELAY	An Off command was received. The lamphead power is turned off. The message is present only for the cool down period, which is about 60 seconds. The unit will not restart until delay time expires.

Obsolete

© 2007 Nordson Corporation

Fault Messages

When a fault is detected, the unit shuts down the high voltage, turns on the FAULT relay output, and displays a fault message. Table 4-3 lists the fault messages.

Table 4-3 Fault Messages

Message	Fault	Description
F PRSW	Pressure Switch	Insufficient or no air pressure in the lamphead.
F LOCK	Interlock	External interlock input is open.
F OTMP	Over Temperature	Transformer thermal switch(es) open. May be caused by insufficient air flow through power supply cabinet.
F STOP	STOP	STOP interlock input is open.
F CABL	Cable Interlock Open	The high-voltage cable and/or the low-voltage cable from the power supply to the lamphead is disconnected or open.
F RF	RF Interlock	RF detector is disconnected or has sensed high levels of RF from the lamphead.
F POWR	Power	Light output or magnetron current has been sensed when the power supply is in the Off mode.
F LOUT	Lamp Out	There was insufficient output from the light detector when the power supply energized the magnetrons in the Lamp On mode.
F NETW	Network	The control board can no longer communicate with a previously detected system.
F IBAL	Magnetron Current Imbalance	The magnetrons are turned on (LAMPON) and the magnetron currents differ by more than 100 ma for a period exceeding about 600 ms.
F OVER	Magnetron Over Current	Either magnetron current exceeds 950 ma in the LAMPON mode.
F FUSE	Open Filament Transformer Circuit	There is no current detected on the filament transformer circuit when the power supply is turned on.
F MAG	Short or ARC	High current has been detected on high-voltage circuit

Obsolete

Resetting a Fault

Operating in the Local Mode: Press the Off button to clear a fault once it has been corrected.

Operating in the Remote Mode: Open and close the off/reset contact to reset a fault once it has been corrected.

NOTE: Once the fault has been corrected a remote unit can be reset by either the front panel of the master unit or a host controlling the master unit.

© 2007 Nordson Corporation

Lamp Start-Up Timing Diagram for Remote Input Contact Closures

See Figure 4-2. The Off/Reset contact must be closed for the unit to go to Standby or On. Once the lamphead is put into the Standby or On mode the lamphead will remain in that mode until the Off/Reset contact is opened.

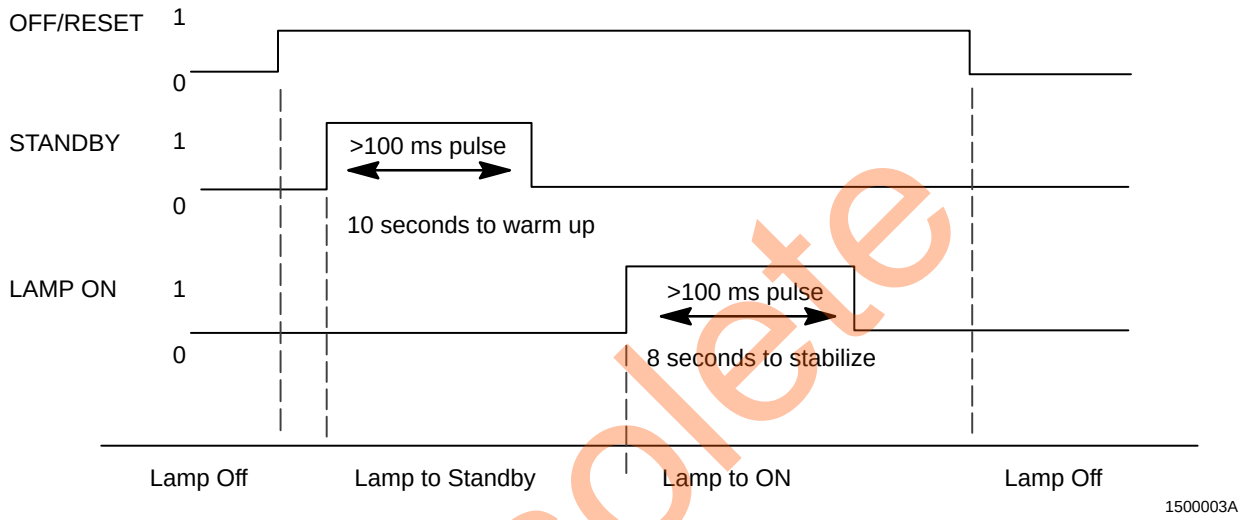


Figure 4-2 Lamp Start Up Timing Diagram for Remote Input Contact Closures

Obsolete

© 2007 Nordson Corporation

Startup

NOTE: Refer to the *Troubleshooting* section if the system fails during startup.

Locally Operated Units

Table 4-4 Startup Procedures for Locally Operated Units

Step	Single Unit Operated Locally	Multiple Units Networked to a Master Unit Operated Locally
1	Switch the electrical disconnect enclosure to ON.	
2	Turn the main power switch on the front of the power supply unit to the ON position. The power on message begins to scroll. The power on message begins with the words UV CURING. Three numbers will then scroll listing the software versions for the display board, main control board, and the phase board respectively.	
3	Make sure that all interlocked access doors are closed and that the exhaust fan is running if not directly connected to the power supply blower contacts. If external interlocks are wired and open, a fault message F LOCK will appear in the display.	
4	On the NETWORK selector, press Local.	Set the NETWORK configuration. • On the master unit's NETWORK selector, press Local. • On the remote unit's NETWORK Selector, press Remote.

Continued...

Obsolete

© 2007 Nordson Corporation

Locally Operated Units *(contd)*

Step	Single Unit Operated Locally	Multiple Units Networked to a Master Unit Operated Locally
5	Set the POWER SETTING. 1. Press the Set/Save button on the POWER SETTING selector until the power level is displayed. 2. Press the up or down arrows to set the desired power level. 3. Press the Set/Save button to save the setting.	Set the POWER SETTING. 1. On the master unit, press the Set/Save button on the POWER SETTING selector until the power level is displayed. 2. Press the up or down arrows to set the desired power level. 3. Press the Set/Save button to save the setting. 4. Set the POWER SETTING at each remote unit between 25 and 100 using the same procedure as the master unit. The POWER SETTING at each remote unit will determine the power output percentage for that unit. For example, if your master unit's POWER SETTING is 100 and your first remote unit's POWER SETTING is set at 50, that remote unit will run on 50% output. If the second remote unit's POWER SETTING is set at 75 then that unit will run at 75% output. Each remote POWER SETTING can be different. Each setting is determined by the POWER SETTING entered in the master control unit and is proportional to the maximum set at each power supply.
6	Enable the cooling fan by either an external/remote switch or a set of contacts from the power supply. If the exhaust fan is wired to the normally open set of contacts on the power supply they will close when the lamphead is put in STDBY or LAMPON mode. If there is insufficient pressure (less than 7 in. W.C. static pressure) there will be a system fault and the message F PRSW will appear in the display. (Check for proper pressure with the appropriate instrumentation.)	

Continued...

Obsolete

© 2007 Nordson Corporation

Step	Single Unit Operated Locally	Multiple Units Networked to a Master Unit Operated Locally
7	Start up the lampheads. **NOTE:** If the LAMPON message does not appear, refer to the *Troubleshooting* section. **Rapid Startup** Use this procedure if your system will sit in an idle state in the STDBY mode before moving to the On mode. 1. On the LAMP selector (or master control unit's LAMP selector) press the LAMP Standby button. There will be an approximate 10 second warm-up time for the filament transformer. WARMUP will appear on the display. 2. After approximately 10 seconds the system will display STDBY until Lamp On is pressed. 3. Press the LAMP On button. It will take approximately eight seconds to stabilize. Or **Standard Startup** Use this procedure to go directly through the warm-up to the On mode. 1. On the LAMP selector (or master control unit's LAMP selector) press LAMP On. WARMUP will appear on the display. 2. After approximately 10 seconds the unit will display LMPDLY. It will take 10 seconds to stabilize as it goes thru the warm up cycle before turning to On. 3. After approximately 10 more seconds and the unit(s) has stabilized at the set power level, LAMPON will appear in the display and the system is ready to run.	

Obsolete

© 2007 Nordson Corporation

Remotely Operated Units

Refer to Table 4-5.

NOTE: The system can be wired to initiate lamphead start from either the process machine or from the UV power supply control panel.

Table 4-5 Startup Procedures for Remotely Operated Units

Step	Single Unit and Units Networked to a Master Unit Operated Remotely
1	Switch the electrical disconnect enclosure to ON.
2	Turn the main power switch on the front of the power supply unit to the on position. The power on message begins to scroll. The power on message begins with the words UV CURING. Three numbers will then scroll listing the software versions for the display board, main control board, and the phase board respectively.
3	Make sure that all interlocked access doors are closed and that the exhaust fan is running. If external interlocks are wired and open, a fault message F LOCK will appear in the display.
4	On the NETWORK selector, press Remote. **NOTE:** For networked units, press Remote at each NETWORK selector.
5	Set the POWER SETTING. There are two ways of setting the POWER SETTING. If the power level will be set at the control panel prior to turning on and off remotely (Remote Operation), select the desired power level and save it while the unit is in Local mode. At the Network Selector then select Remote.
6	Enable the cooling fan by either an external/remote switch or a set of contacts from the power supply. If the exhaust fan is wired to the normally open set of contacts on the power supply they will close when the lamphead is put in STDBY or LAMPON mode. If there is insufficient pressure (less than than 7 in. H_2O static pressure) there will be a system fault and the message F PRSW will appear in the display. (Check for proper pressure with the appropriate instrumentation.)
7	There are many ways that the system can be configured to operate Remotely. By utilizing the power supply I/O the UV system can be controlled from a simple panel or fully automated to work in concert with a complete process. Contact a Nordson UV Curing representative for details.

Obsolete

© 2007 Nordson Corporation

Shutdown

The system will stop if any of the following conditions occur:

- LAMP STOP push button on UV operator station is pressed
- The power supply switch is turned to the off position
- The LAMP On/Off switch is turned to Off
- Cooling air for the lamphead ceases or reaches an insufficient level
- Any of the safety interlocks wired into the UV equipment are interrupted. These include exhaust fan, access panels, doors and process equipment
- Any fault condition occurs

Refer to Table 4-6 for shutdown procedures for the CoolWave UV system.

Table 4-6 Shutdown Procedures

Step	Shutting Down Systems Locally	Shutting Down Systems Remotely
1	Press the Lamp Off button.	Press the Lamp Off button on the remote or host machine.
2	Allow the lampheads five minutes of cool down before shutting off the cooling air. **CAUTION**: Failure to do this can cause problems restarting the lamps as well as greatly reduce the life of the lamphead bulbs.	Allow the lampheads five minutes of cool down before shutting off the cooling air. **CAUTION**: Failure to do this can cause problems restarting the lamps as well as greatly reduce the life of the lamphead bulbs. **NOTE:** Typically the cooling fan will be controlled by the remote or host machine through the I/O of the UV System.
3	Turn off the main power to all units.	

Obsolete

© 2007 Nordson Corporation

Obsolete

© 2007 Nordson Corporation

Section 5
Maintenance and Repair

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Maintenance and Replacement Schedule

Recommended maintenance to the power supply consists of cleaning or changing the cooling fan filter material and removing dust from the power supply.

Establish acceptable curing levels for your process and then develop a maintenance schedule that fits your needs. Radiometers can be used to measure relative readings for spectral output as a means of monitoring spectral intensity.

The maintenance and replacement schedule for the system will depend upon your:

- application process
- plant environment
- quality of cooling air passing through the system
- coating formulation

Table 5-1 Typical Maintenance and Replacement Schedule

Component	Maintenance Guidelines	Replace component...
Filters Remote blower Cooling fan electrical enclosure/ lamphead	Filter material is designed to capture dust and contaminants from the plant before entering the UV equipment. These filters are located on the lampheads, remote blowers, and some power supplies (customer-supplied filters). Eventually, the filters will become loaded with matter and will start to impede the flow of air. A dirty filter also will release matter into the air stream that may deposit on the part being cured as well as the bulb and reflector. Use soap and water to wash all filter material that provides cooling to any part of your UV system.	Weekly or as needed
NOTE: Dirty filters can cause excessive heat, which will cause premature failure.		

Obsolete

© 2007 Nordson Corporation

Replacement Procedures

Preparation

1. Turn off the UV system from the process equipment controller or at the UV panel.
2. Allow the lamphead fan to complete its cooling cycle. If this has been prevented by premature isolation of the control cabinet, always allow sufficient time for the bulb to cool before proceeding.
3. Turn off the main electrical disconnect. Follow all relevant OSHA established lockout procedures.

Main Control Board

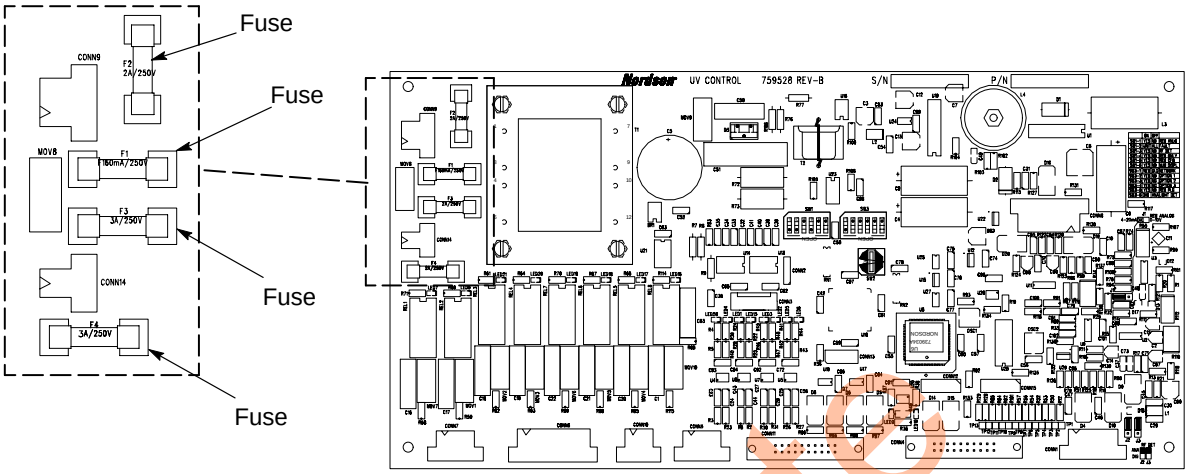
1. Remove the 10 M5 screws fastening the top cover of the power supply. Remove the top cover.
2. Locate the main control board on the inner wall of the power supply and and disconnect all of its connectors.
3. Using a #1 Phillips screwdriver, remove the six M3 screws securing the main control board.
4. Carefully pull the main control board from the power supply.
5. Using the old control board or the *Installation* section as a guide, configure the new main control board with the appropriate SW1 and SW3 dip switch settings, power supply address switch, remote analog jumper and digital/analog light detector jumper.
6. Place the new control board in the proper position with the board's part number located at the top and secure the board the the power supply's inner wall with six M3 screws.
7. Secure the power supply's top panel with the 10 M5 screws.
8. Connect all the main control board connectors removed in step 2 of this procedure.
9. Restore power to the power supply and operate according to the procedures set up in this manual.

Obsolete

© 2007 Nordson Corporation

Fuses

See Figure 5-1 to identify the four replaceable fuses on the main control board.



1500120A

Figure 5-1 Main Control Board Fuses

Air Filter and Power Supply Cooling Fan Cleaning

NOTE: Repeat the same procedure for all external blowers.

NOTE: Some filter media can be washed and reused. Refer to the users' manual for your blower.

1. Turn off the main electrical disconnect. Follow all relevant OSHA-established lockout procedures.
2. Locate the cooling fan on the power supply. It is located on the front side of the power supply.
3. Make sure the safety cover is clean and free of any debris.
4. Examine fan blades for contamination. Clean or replace if necessary.

Obsolete

© 2007 Nordson Corporation

Obsolete

© 2007 Nordson Corporation

Section 6
Troubleshooting

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Introduction

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

General Troubleshooting

NOTE: If your unit does not start up, disconnect power to the unit then remove the cover and check the fuses. See Figure 7-1 for fuse locations.

Problem	Possible Cause	Corrective Action
1. Lamp Fault **Fault Message:** **F LOUT**	The light detector outputs a voltage when the lamphead is in operation: the voltage drops below a minimum	Check the magnetron current, main fuses, phase control board, and light detector.
	Interconnect cable at lamphead or power supply is loose	Disconnect and reconnect the cable.
	Bulb has failed	Replace the bulb.
2. Pressure Fault **Fault Message:** **F PRSW**	Cooling fan is not running	Remote Blower: Check the motor starter, fuses, and overloads. Reset or replace overloads and/or fuses if necessary.
	Cooling fan is running in reverse	Check the wires at the blower and at the starter, check the fan rotation.
	Filter on cooling fan is dirty	Replace the filter on the blower. Wash the filter on the remote blower with soap and water.

Continued...

Obsolete

© 2007 Nordson Corporation

General Troubleshooting *(contd)*

Problem	Possible Cause	Corrective Action
2. Pressure Fault **Fault Message:** **F PRSW** (*contd*)	Pressure sensor has failed	The pressure sensor is a normally open switch that closes with 7-in. wc static pressure. Make sure both the external and internal port of the switch are open and there are no obstructions. If there are no obstructions and the blower is operating correctly, replace the switch.
	Pressure drop in remote blower ducting is too great	Ducting to the remote blower should be large enough with minimum of sharp bends to supply adequate ventilation. If pressure faults have consistently been a problem, you may want to consider mounting the remote blower closer to the lamphead or increasing the duct size or blower.
3. Magnetron Current Fault **(Normal magnetron current is 850 ma ± 5% at 100% power.)** **Fault Message:** **F POWR**	The current in one or both magnetrons has dropped below 200 ma for a duration of more than 600 ms	Reset the lamphead and restart the system. If the problem still exists there may be a magnetron failure.
	Magnetron current is detected when unit is off	Reset the lamphead and restart the system. If the problem still exists there may be a magnetron failure.
4. Interlock Fault **Fault Message:** **F LOCK**	Open external interlock	Check all system interlocks.

Continued...

Obsolete

© 2007 Nordson Corporation

Problem	Possible Cause	Corrective Action
5. Power Supply Overtemp **Fault Message:** **F OTMP**	Insufficient air flow to the power supply	Clean the blower filters and make sure that there are no obstructions in the blowers and the filters.
	Main power supply	Check the main power supply for proper voltage.
6. Magnetron Overcurrent Fault **Fault Message:** **F OVER**	Magnetron current has exceeded 950 ma	Check all the power supply to lamphead cables for damage or arcing. Check for signs of arcing in the lamphead.
7. Network Fault **Fault Message:** **F NETW**	A fault has been detected somewhere on the network; the master shows F NETW and the problem unit will display the specific fault	Determine the unit with the fault and correct the fault. Clear the master or individual control unit.
8. E-Stop system will not start **Fault Message:** **F STOP**	Pins 1 and 2 on the input are not jumpered	Add an E-Stop jumper between pins 1 and 2.
	E-Stop buttons are activated either on the power supply or external equipment	Check and release all E-Stops.
9. Irradiator will not light **Fault Message:** **F CABL**	Power supply to lamphead cables disconnected or faulty	Check the cable connections. Check the continuity of cables.
10. RF Fault **Fault Message:** **F RF**	RF detector switch is not set properly on control board	Check the dip switch setting on the main control board.
	RF detector is not properly connected	Check the connections.
	RF cable is faulty	Check the continuity of the cable. Replace the cable if necessary.
	RF detector is detecting a high level of RF	Check the lamphead screen for holes and tears. Replace the lamphead screen if necessary. Check to make sure the screen is securely fastened.

Continued...

Obsolete

© 2007 Nordson Corporation

General Troubleshooting *(contd)*

Problem	Possible Cause	Corrective Action
11. Magnetron current imbalance **Fault Message:** **F IBAL**	The current from magnetron 1 and magnetron 2 has differed by more than 100 ma for a time longer than 600 ms	Check the SCRs and phase control board. Check that the fuses are ok.
	Magnetron current has fallen below 200 milliamps	Check the diode block five ohm feedback resistor for short or open.
12. Open filament transformer circuit **Fault Message:** **F FUSE**	Filament transformer fuse blown	Check fuse on main circuit board.
	Filament transformer bad	Check output of filament transformer.
	Filament in magnetron failed	Replace the magnetron.
13. High current on high-voltage circuit **Fault Message:** **F MAG**	Short in high-voltage cable	Replace the high-voltage cable.
	Short in lamphead	Inspect the wiring inside the lamphead.
	Magnetron has failed	Replace the magnetron.

Obsolete

© 2007 Nordson Corporation

Section 7
Parts

Introduction

To order parts, call the Nordson Finishing Customer Support Center at (800) 433-9319 or your local Nordson representative. Use the parts lists and illustrations to locate and describe parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

Obsolete

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

© 2007 Nordson Corporation

Power Supply

See Figure 7-1.

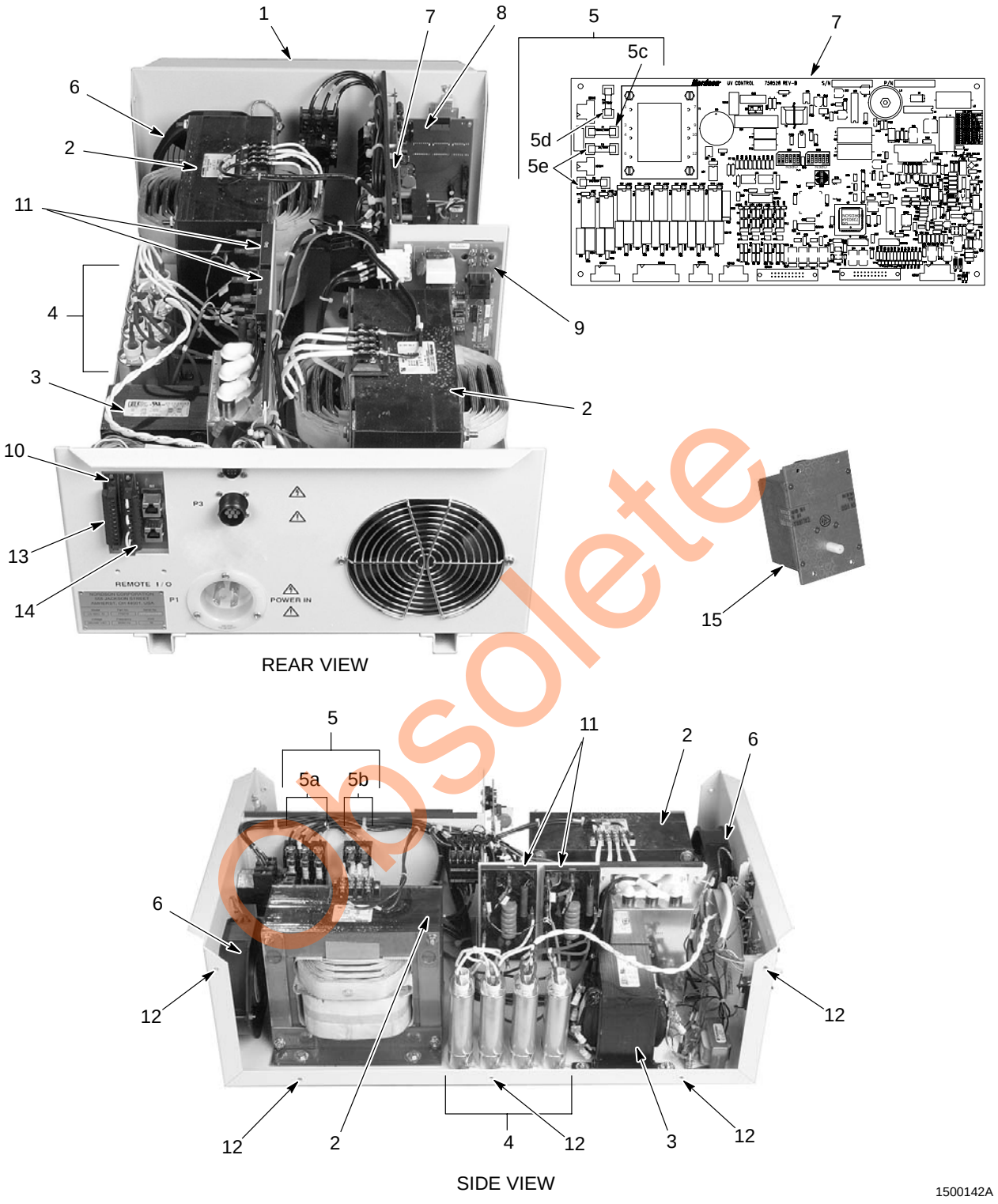
Item	Part	Description	Quantity	Note
1	1059510	50/60 HZ POWER SUPPLY, CoolWave	1	
2	772227	• POWER TRANSFORMER, CoolWave	2	
3	772241	• TRANSFORMER, step down, 480-240	1	
4	772237	• 50/60 Hz CAPACITOR, 1.1 Mf, 2500 Volt, CoolWave	4	
5	775080	• FUSE, kit, CoolWave	1	A, B
5a	- - - - - -	• • FUSE, 30 amp	3	B
5b	- - - - - -	• • FUSE, 2 amp	2	B
5c	- - - - - -	• • FUSE, 160 ma, 250 volt	1	B
5d	- - - - - -	• • FUSE, 2 amp, 250 volt	1	B
6	772214	• FAN, cooling, CoolWave	2	A
7	1060421	• PCB, CONTROL, CoolWave, MPS610V	1	
8	320265	• PCB, DISPLAY, CoolWave	1	
9	320271	• PCB, PHASE, CoolWave	1	
10	320475	• PCB, I/O, CoolWave	1	
11	775150	• MODULE, rectifier, CoolWave	2	
12	- - - - - -	• SCREW, M5 x 10	10	
13	1066179	• TBCONN, 12 pos, 1 row, fem, str, 5mm	1	
14	1066210	• TBCONN, 13 pos, 1 row, fem, str, 5 mm	1	
15	775022	RF DETECTOR, CoolWave 6/10	1	

NOTE A: Recommended spare part. Keep this part in inventory to avoid unplanned downtime.

B: Fuse kit 775080 contains three 30 amp, 500 volt main fuses; two 2 amp, 500 volt fuses for the step down transformer; one 160 microamp, 250 volt control board fuse; one2 amp, 250 volt fuse for the filament transformer, and two 3 amp, 250 volt fuses (not used in this power supply).

Obsolete

© 2007 Nordson Corporation



Obsolete

Figure 7-1 CoolWave Power Supply and RF Detector

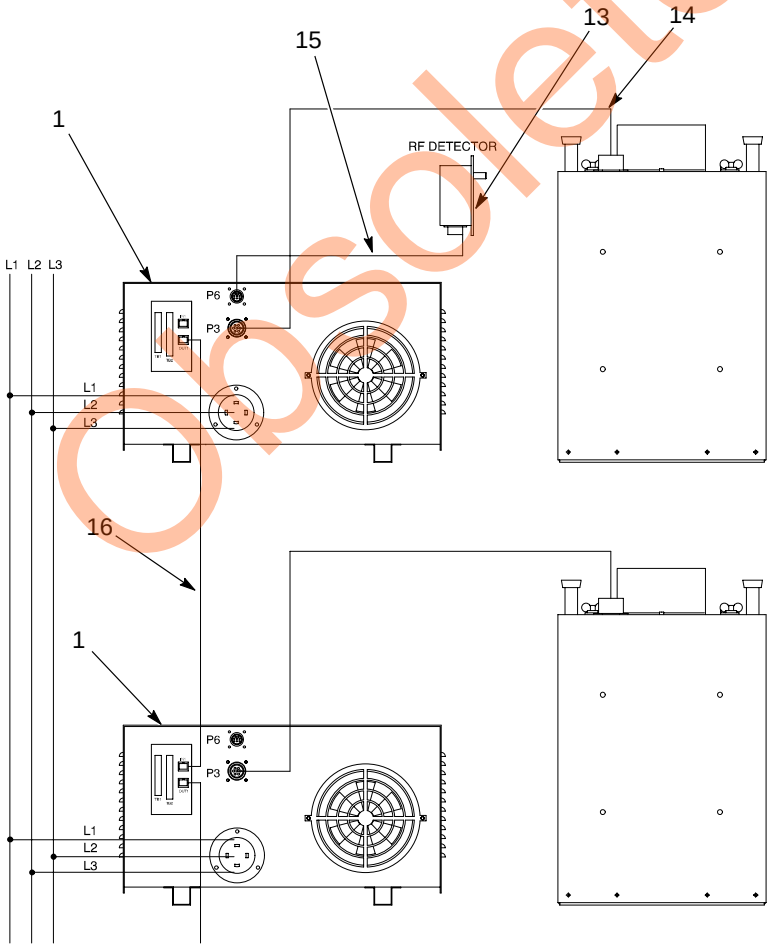
© 2007 Nordson Corporation

Power Supply Cables

See Figure 7-2. Order the correct cable length for your particular system.

Item	Part	Description	Quantity	Note
14	775374	12-ft UNICABLE	1	
14	775023	25-ft UNICABLE	1	
14	775375	50-ft UNICABLE	1	
14	775377	75-ft UNICABLE	1	
14	775380	100 ft UNICABLE	1	
15	1061134	12 ft CABLE, RF detector, 6/10	1	
15	775029	25 ft CABLE, RF detector, 6/10	1	
15	775050	50 ft CABLE, RF detector, 6/10	1	
15	775051	75 ft CABLE, RF detector, 6/10	1	
15	775052	100 ft CABLE, RF detector, 6/10	1	
16	775031	NETWORK CABLE, 6 ft, 6/10	1	

Obsolete



1500143A

Figure 7-2 Power Supply Cables

© 2007 Nordson Corporation

Recommended Spare Parts

Keep the following parts in inventory to avoid unplanned downtime. Quantities listed support a lamphead or power supply.

NOTE: Most of the recommended spare parts are listed with a level number (1, 2, or 3) to identify the part's level of importance to system operation. Level 1 parts are critical to the day-to-day operation of the UV curing system, so be sure to keep these parts in inventory.

Part	Description	Quantity	Level	Note
1053812	FUSE, kit, CoolWave	1	1	
775374	12-ft UNICABLE	1	2	
1059674	25-ft UNICABLE	1	2	
775375	50-ft UNICABLE	1	2	
775377	75-ft UNICABLE	1	2	
775380	100-ft UNICABLE	1	2	
775064	FILAMENT TRANSFORMER, CoolWave	2	2	
1060421	PCB, CONTROL, CoolWave, MPS610V	1	2	
320265	PCB, DISPLAY, CoolWave	1	2	
320271	PCB, PHASE, CoolWave	1	2	
320475	PCB, I/O, CoolWave	1	2	
1059510	50/60 HZ POWER SUPPLY, CoolWave, unicable	1	3	
775022	RF DETECTOR, CoolWave, 6/10	1	3	
1061134	12 ft CABLE, RF detector, 6/10	1	3	
775029	25 ft CABLE, RF detector, 6/10	1	3	
775031	NETWORK CABLE, 6 ft, 6/10	1	3	
772237	50/60 Hz CAPACITOR, 1.1 Mf, 2500 Volt, CoolWave	4	3	
775022	FAN, cooling, CoolWave	2	3	
1061254	MANUAL, MPS610V power supply with Unicable	1	3	
1061253	MANUAL, CW610 lamphead with Unicable	1	3	

Obsolete

© 2007 Nordson Corporation

Obsolete

© 2007 Nordson Corporation

Section 8
Specifications

Power Supply

Table 8-1 Power Supply Specifications

Item	Specification	
Dimensions length width height	753 mm (29.65 in.) 465.5 mm (18.33 in.) 256.3 mm (10.09 in.)	
Weight	105 kg (230 lb)	
Voltage	440/480 Vac, 3⊘, at 60 Hz	380/400 Vac, 3⊘, at 50 Hz
Current	Refer to Table 8-2	
Ambient Temperature	13-49 °C (55-120 °F)	

Table 8-2 Current Draw

Line	60 Hz		50 Hz	
	Amps @ 440 Vac	Amps @ 480 Vac	Amps @ 380 Vac	Amps @ 400 Vac
L1	13	12	16	15
L2	21	18	25	23
L3	13	12	16	15

Obsolete

© 2007 Nordson Corporation

Magnetron Current

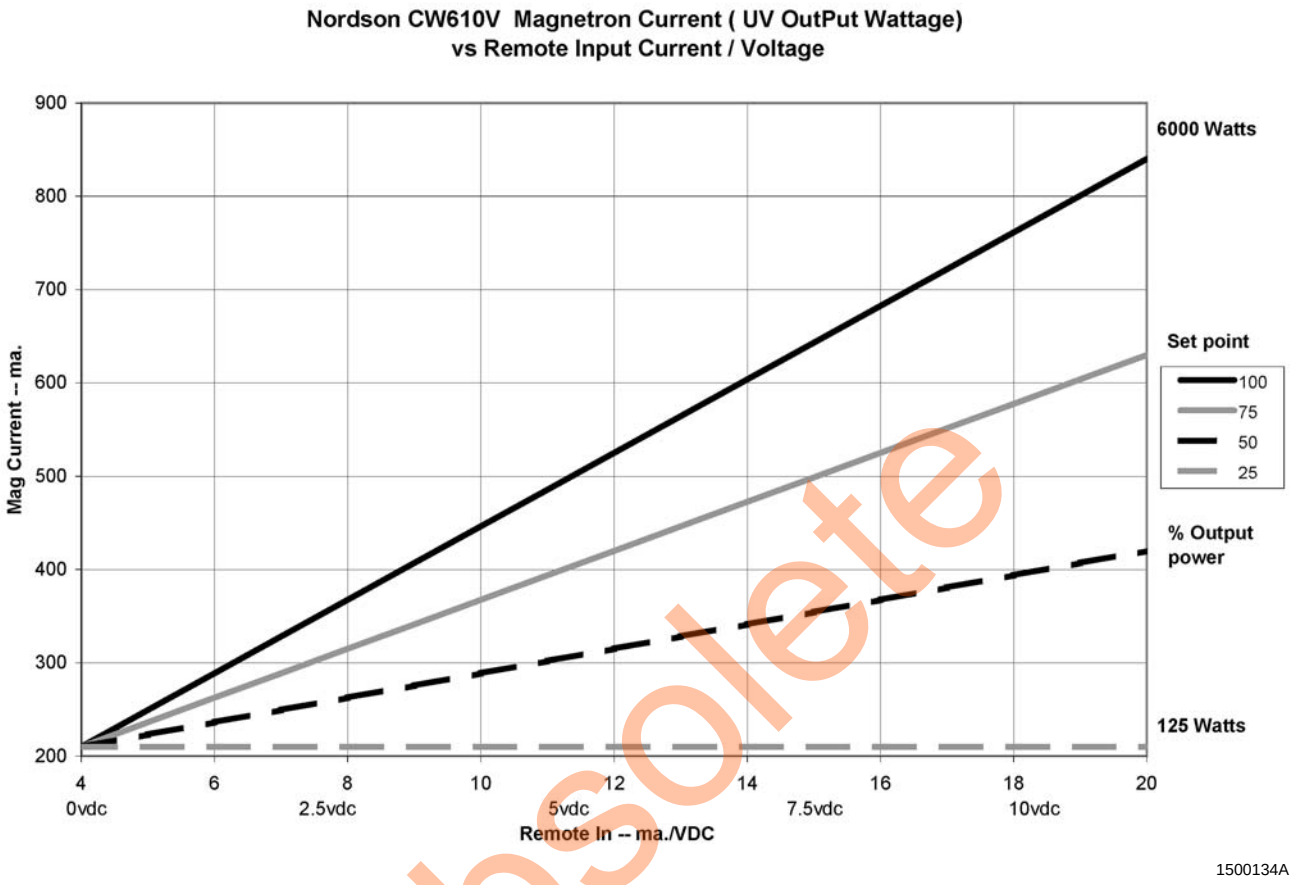


Figure 8-1 Magnetron Current UV Output Wattage vs Remote Input Current/Voltage

Obsolete

System Drawings

See Figures 8-2 through Figure 8-5 for the following system drawings.

Figure 8-2: UV Connector Board

Figure 8-3: IO Wiring

Figure 8-4: System Schematic

Figure 8-5: System Installation

© 2007 Nordson Corporation

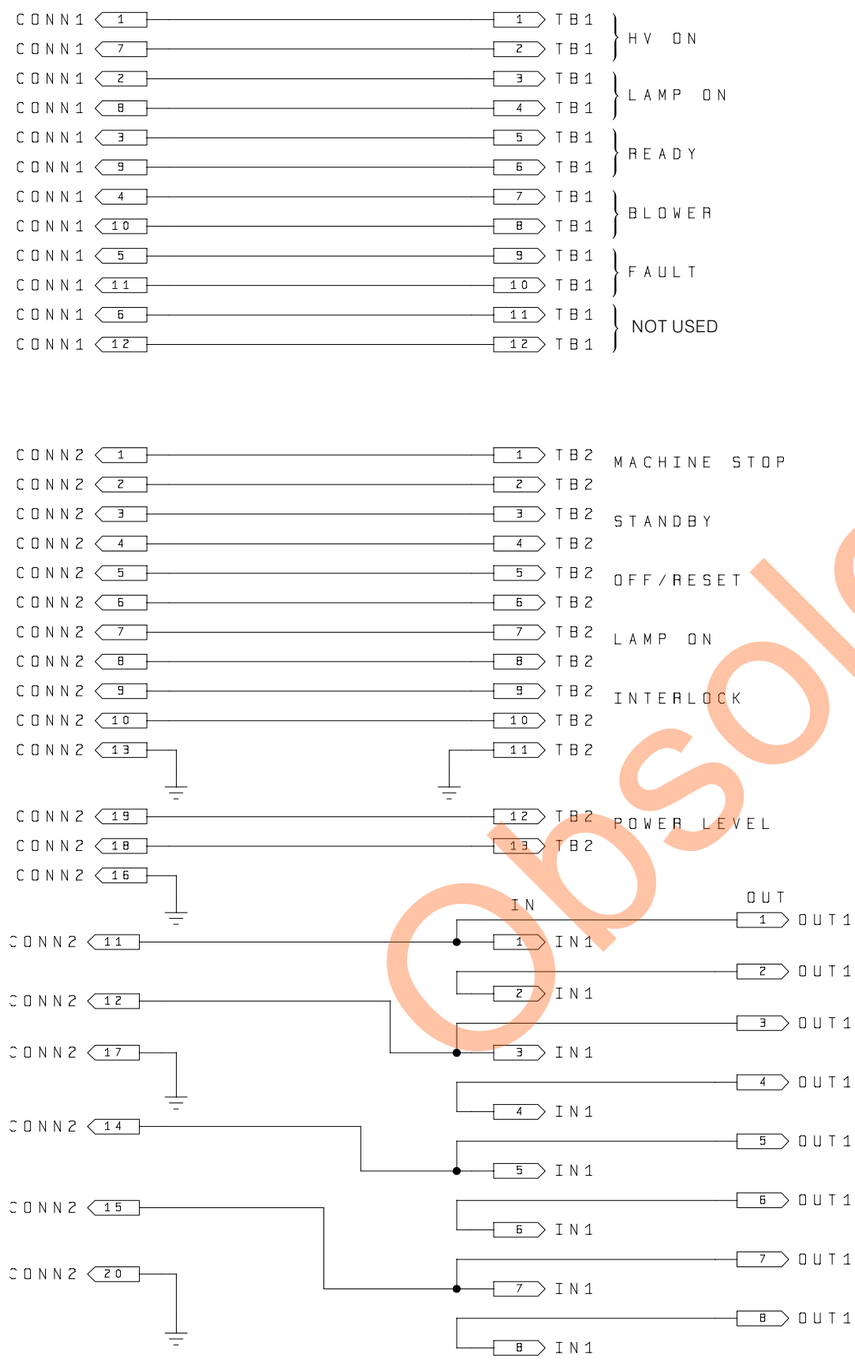
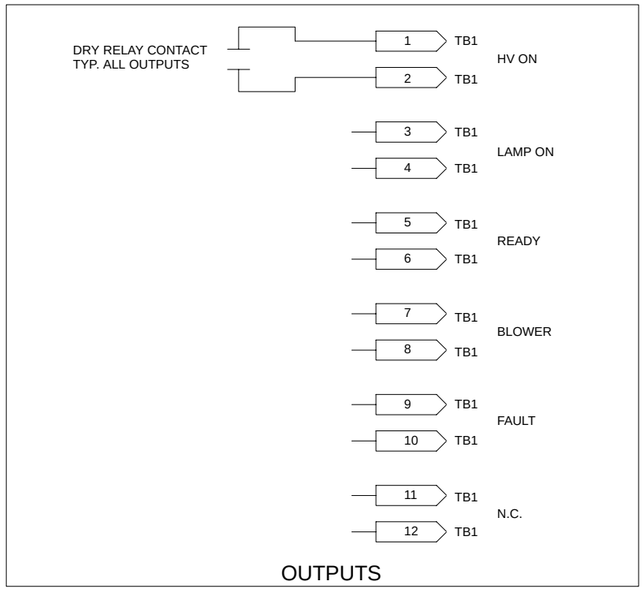
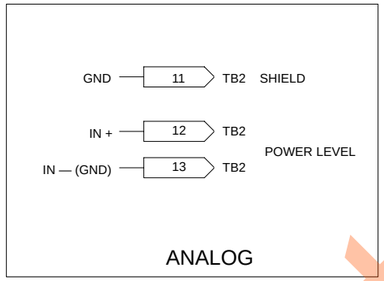


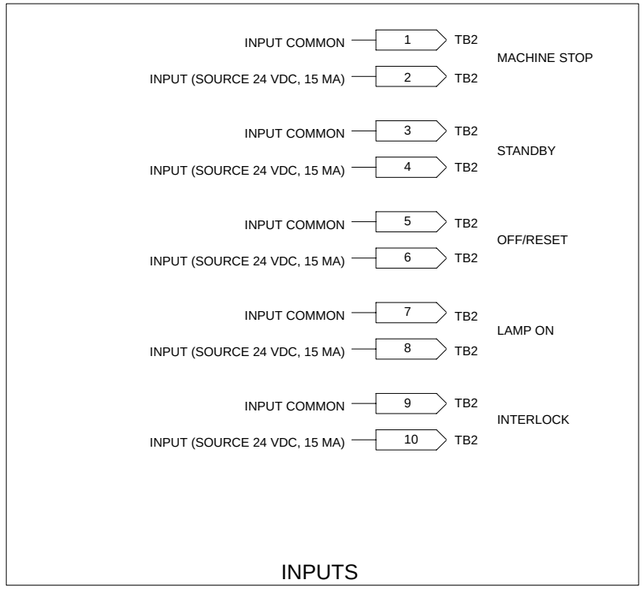
Figure 8-2 UV Connector Board

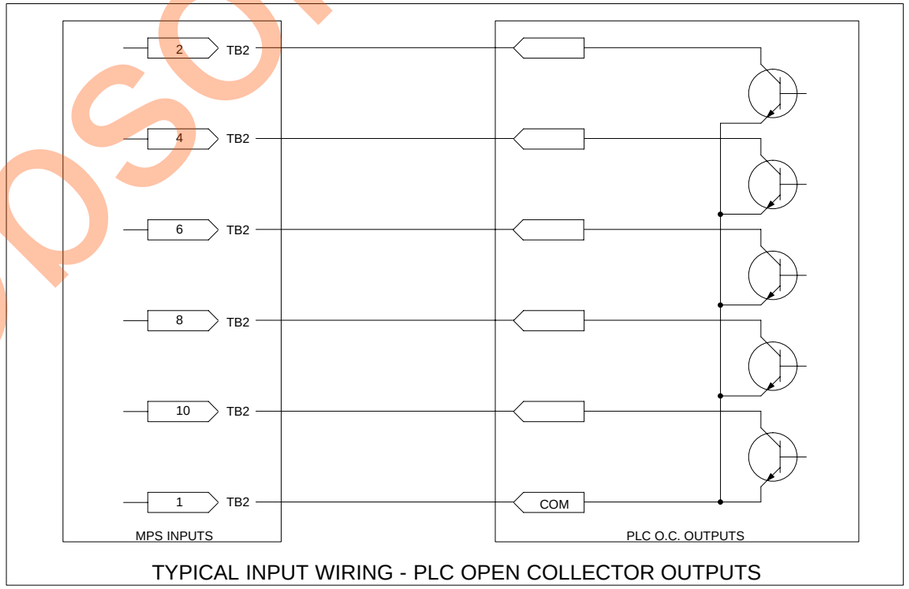
Obsolete

© 2007 Nordson Corporation







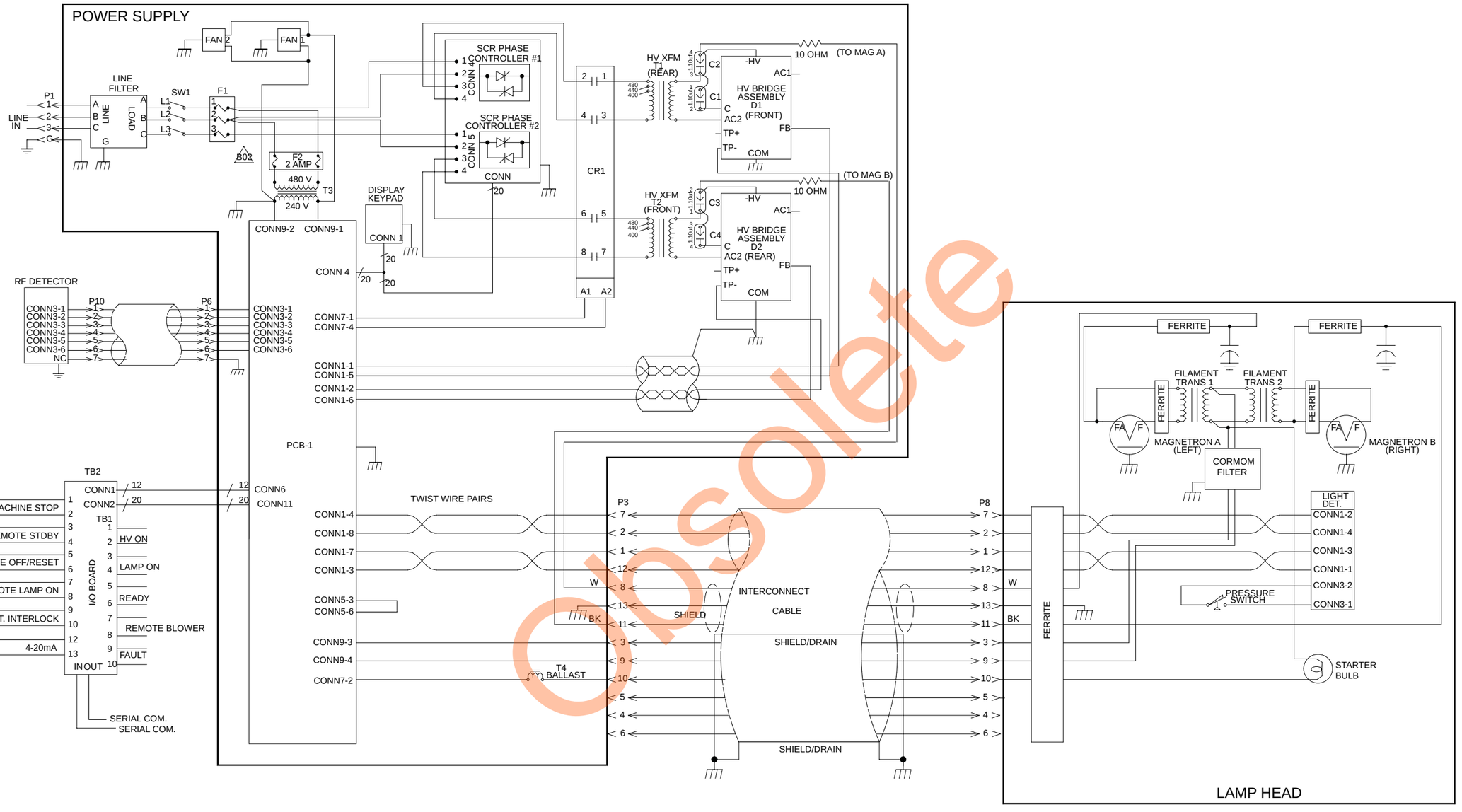


Obsolete

1500135A

Figure 8-3 IO Wiring

© 2007 Nordson Corporation

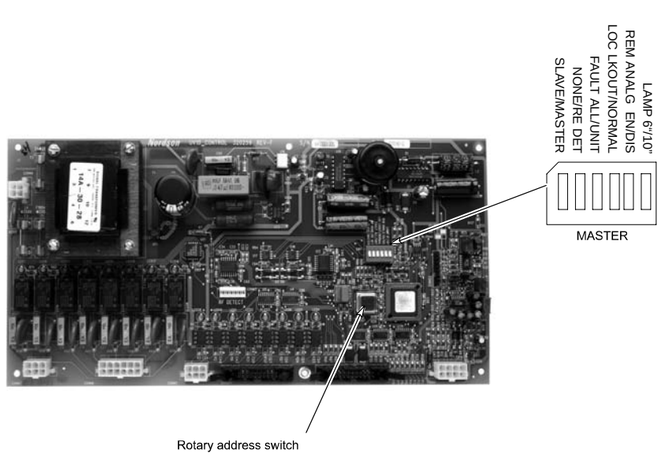


1500137A

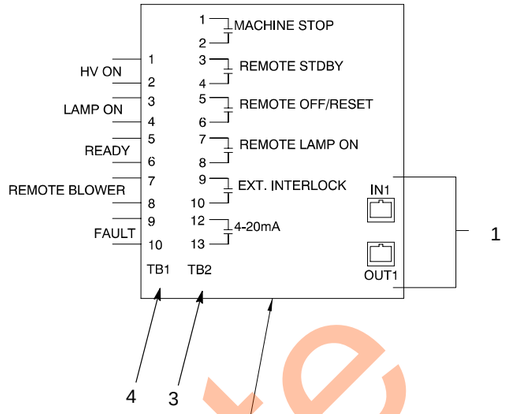
Figure 8-4 System Schematic

Obsolete

© 2007 Nordson Corporation



NOTE: THIS BOARD MANUFACTURED PRIOR TO AUG 2004



NOTE: Refer to the Installation section for correct main board settings.

1500144A

Figure 8-5 System Installation

Obsolete

© 2007 Nordson Corporation

Section 9
UV Glossary

absorption — Not reflecting. The partial loss in energy that results when light passes through or reflects off a medium.

actinic UV — Low-powered UV in the UVC band. Usually powered with several 100-watt power supplies or less instead of several 1000-watt power supplies. Nordson's UV Star and CoolWave product lines are much higher in irradiance and energy density than actinic UV products.

additive bulb — A mercury bulb that contains metal additives such as iron, gallium, indium, or others. These bulbs produce variations in spectral output as compared to mercury only bulbs.

adhesion — The state in which two surfaces are stuck together.

arc length — The distance measured between the electrodes in a quartz bulb. Also Refer to effective cure length.

ASTM spec D3359-95a — Refer to tape test.

ballast — An inductive transformer device that stabilizes the amount of current flowing through the bulb so that the power output remains constant.

black light UV — Low powered UV composed of wavelengths in the UVA band. Usually powered with several 100-watt power supplies or less instead of several 1000-watt power supplies. Nordson's UV Star and CoolWave product lines are much higher in irradiance and energy density than black light UV products.

bulb — A sealed quartz tube that contains a mixture of inert gas and mercury under medium pressure. Electrode bulbs are fitted with electrical connections at the ends of the bulb. Microwave bulbs contain no electrical connections. The mercury and inert gas are energized (vaporized) by either a voltage arc or microwave energy. The vaporized plasma gas emits UV light.

burn-in period — The second stage of the startup process of an electrode UV bulb. The total time that it takes the current and voltage inside the bulb to stabilize during startup.

Obsolete

© 2007 Nordson Corporation

capacitor	Corrects the power factor in the main power supply to reduce current levels in the UV system.
cold mirror	A reflector that is coated with a dichroic material that absorbs or passes wavelengths in the infrared range while reflecting those in the UV range. Refer to dichroic.
cover	The upper half of the lamp head assembly or the sheet metal top of the power supply. In the lamp head, the cover contains openings and baffles through which cooling air passes.
cradle	Supports the UV bulb and reflector inside an electrode lamp head housing.
cross hatch test	Refer to tape test.
cure	A UV drying process that occurs through a chemical reaction between a UV ink or coating and UV light.
cure length	Refer to effective cure length.
dichroic	A coating designed to pass certain wavelengths and reflect other wavelengths. In UV lamp heads, dichroics are used on reflectors to pass or absorb infrared energy and reflect UV energy.
devitrification	The act of making quartz glass opaque and porous through prolonged heating and UV exposure.
doped bulb	Refer to additive bulb.
dose (dosage)	Refer to energy density.
dose rate (dosage rate)	Refer to irradiance.
Dual Concentrated Focus (DCF)	An electrode system where two bulbs and two angled reflectors are positioned within one cradle. The UV light in a DCF system is concentrated into a single band of energy.
dynamic exposure	Exposure to a varying irradiance. It occurs when a lamp head passes over a substrate without pausing or when a substrate passes under a lamp head without pausing.

Obsolete

© 2007 Nordson Corporation

dynamic range	The span between the minimum irradiance and the maximum irradiance to which a radiometer will accurately respond. Measured in joules/cm^5.
effective cure length	The length of a bulb that delivers optimal UV output. For electrode bulbs, the effective cure length is always less than the arc length. For microwave bulbs, the effective cure length is the length of the bulb.
electrode	The electrical fitting on the inside of an arc bulb. The electrode consists of a tungsten pin surrounded by a tungsten coil and is used to maintain a voltage arc across the bulb. Electrode is also used to refer to the style of bulb or system when differentiating between microwave and electrode bulbs and microwave and electrode systems.
electrodeless	A microwave-powered UV system.
electromagnetic spectrum	The full wavelength range of electromagnetic radiation, including microwave, ultraviolet, visible, and infrared energy.
energy density	The total amount of UV energy delivered to a particular area, measured in joules/cm^2. Also referred to as total energy. Improperly referred to as dose.
erythermal UV	Low-powered UV in the UVC band. Usually powered with several 100-watt power supplies or less instead of several 1000-watt power supplies. Nordson's UV Star and CoolWave product lines are much higher in irradiance and energy density than erythermal UV products.
flood	An unfocused band of UV light that is more evenly and diffusely distributed across the width of the reflector.
flux	The flow of photons, measured in einsteins/second.
focal distance (length)	The perpendicular distance from the edge of the lamp head to the point where the UV light emitting from the bulb converges. This is the location of maximum UV concentration.
focus	The band where the UV energy reflected from the lamp head is at the highest concentration.
frequency	The number of times a periodic wavelength cycle occurs in one second, measured in Hertz (Hz).

Obsolete

© 2007 Nordson Corporation

gallium	A bluish-white metallic element used in additive mercury bulbs. The gallium additive provides a yellowish tint to an unenergized UV bulb and a violet coloration to the UV output. Gallium bulbs have a spectral peak around 417 nm and a spectral concentration between 400 and 450 nm. They are often used when deeper cure is required or with white coatings containing titanium oxides. In some industries, microwave gallium bulbs are referred to as V bulbs.
germicidal UV	Low-powered UV in the UVC band. Usually powered with several 100-watt power supplies or less instead of several 1000-watt power supplies. Nordson's UV Star and CoolWave product lines are much higher in irradiance and energy density than germicidal UV products.
housing	The lower half of the lamp head assembly. Its function is to support the cradle.
igniter	Refer to starter.
indium	A silver-white metallic element used in additive mercury bulbs. The indium additive provides a yellowish tint to an unenergized UV bulb and a violet coloration to the UV output. Indium is used to shift the spectral output past 400 nm. In some industries, indium bulbs are referred to as Q bulbs.
infrared energy	Energy having wavelengths between 1 and 100 µm.
integral cooling fan (blower)	The bulb-cooling fan when it is mounted to the lamp head.
integral shutter	A shutter assembly that is built into the lamp head. Common designs include a pneumatically actuated clam shell that blocks the light when closed and acts as a reflector when open and a pneumatic slide mechanism that moves the lamp head behind an internal louver when shuttered. Shutters are typically associated with electrode systems.
intensity	The amount of UV energy delivered to a particular area per unit time, measured in joules/cm^2/sec or watts/cm^2/sec. Also referred to as watt density. Improperly referred to as dose rate.
iron	A white metallic element used in additive mercury bulbs. The iron provides a reddish tint to an unenergized UV bulb and a bluish coloration to the UV output. Iron is used to concentrate the spectral output between 350 and 400 nanometers. In some industries, iron bulbs are referred to as D bulbs.
irradiance	Radiant power arriving at a surface from all forward angles per unit area, measured in watts/cm^2.

Obsolete

© 2007 Nordson Corporation

irradiator Refer to lamp head.

joule Metric unit for measuring work or energy. One joule is equivalent to the work done by a force of one Newton acting through a distance of one meter. (1 KW-hour equals 3.6×10^6 joules).

lamp Refer to bulb.

lamp head Assembly containing a sheet metal housing and cover and integral or remote cooling fan. An electrode system also contains cradles and a microwave system contains magnetrons, a cavity, and a screen.

light detector A photocell inside a microwave lamp head that confirms UV output.

long UV Refer to UVA.

louver A part of a UV shutter system or shielding section that blocks the UV light while allowing cooling air to pass through.

magnetron Assembly contained inside a microwave lamp head that converts high-voltage electrical input into RF energy.

mercury A silver-white metallic element that is liquid at room temperature and is used to create a vaporized, UV-emitting gas plasma inside a quartz tube when it is energized through the use of either a voltage arc or microwave energy. When energized the bulb produces a bright white UV output. Mercury bulbs have a peak spectral output around 365 nm and a concentration around 254 nm. In some industries, mercury bulbs are referred to as H bulbs.

mercury plus (H+) Microwave bulbs that contain additional mercury. Mercury plus bulbs are only available in microwave systems as it is difficult to vaporize the additional mercury in an electrode bulb.

mercury arc An electric discharge passed between two electrodes and through a mercury vapor medium inside a quartz tube.

metal halide bulb Refer to additive bulb.

micrometer (μm) Unit of length equivalent to one millionth of a meter.

microwave That part of the electromagnetic spectrum associated with the larger infrared waves and the shorter radio waves.

Obsolete

© 2007 Nordson Corporation

monomers	A molecule of relatively low molecular weight and simple structure capable of combining with itself or other similar molecules to form polymers.
nanometer (nm)	Unit of length equivalent to one billionth of a meter.
negative cooling	When the cooling air for the lamp head is drawn from the area surrounding the substrate being cured and through the lamp head. Negative cooling provides exhaust for the UV system if it is ducted to atmosphere. Negative cooling is most often supplied through a remote cooling fan.
nitrogen blanketing	Refer to nitrogen inerting.
nitrogen inerting	When the coating or ink is flooded with a nitrogen blanket to prevent the coating or ink from oxidizing before cure. Nitrogen inertion reduces oxygen inhibition.
oligomers	A low molecular weight resin or polymer used in a radiation curable coating.
out-of-focus	When a lamp head is located further away from the substrate or closer to the substrate than the focal distance.
oxidizing	When the coating or ink reacts with oxygen and slows the polymerization process of the cure.
oxygen inhibition	Oxygen slows the cure response of UV curable coatings. The higher the ratio of exposed surface area to coating mass, the greater the impact oxygen has on the coating.
ozone (O_3)	An unstable, colorless gas with a penetrating odor that is generated by the reaction of short-wave UV light (≈184 nanometers) with air.
ozone-inhibiting (ozone-free) bulbs	Bulbs where the quartz is manufactured with an additive that prevents the transmission of UV beneath 200 nm in wavelength. It is the reaction of short-wave UV light (≈184 nanometers) with air that produces ozone.
Parts Per Million (PPM)	The units of the Threshold Limit Value (TLV) when referring to the maximum level of a substance that a person should inhale over an 8-hour shift during a 40-hour week without producing an ill effect. Also refer to Threshold Limit Value.
peak irradiance (peak power density)	The maximum irradiance measured over a sample period, measured in joules/cm^2/sec or watts/cm^2.

Obsolete

© 2007 Nordson Corporation

photoinitiator — A molecule which when exposed to a specific wavelength of energy forms a reaction that begins the cure process.

photopolymerization — Turning a liquid (wet) into a solid (dry) through exposure to UV light.

planar shutter — A shutter assembly that is attached to the outside of a lamp head. The louvered shutter moves perpendicular to the emitted UV light.

polymer — A macromolecule consisting of a large number of monomer units.

positive cooling — When the cooling air for the lamp head is blown through the lamp head and onto the substrate being cured. Positive cooling can be supplied through either an integral or remote cooling fan. With positive cooling, an additional exhaust system is required to remove heat and ozone.

post cure — The continuation of chemical reactions in the ink or coating after exposure to UV has ceased.

power density — Refer to irradiance.

quartz plate — Plates that allow UV energy to penetrate with minimal loss in intensity and are mounted in front of the lamp head. The plates are used to prevent positive cooling air and airborne contaminants from contacting the substrate, negative cooling air from contaminating the bulb and reflectors, or to remove some of the infrared that is radiated from the UV bulb. If the goal is to reduce the amount of heat contacting the substrate, additional cooling air must be blown across the quartz. If additional air is not used, the quartz will eventually heat up and begin radiating heat onto the substrate. To further reduce heat, the quartz can be coated with a material that passes UV light and absorbs infrared energy.

quartz tube — (1) A sealed tube made from a silicate material that is filled with a precise mixture of mercury and various inert gases and sometimes fitted with electrical connections. The vapor emits light when it is energized through the use of either a voltage arc or microwave energy. Often used to refer to the bulb.

(2) An open tube made from a silicate material through which a substrate can pass. The tube is often placed in front of a UV lamp head and flooded internally with Nitrogen. Parts traveling through the tube are then safeguarded from exposure to the oxygen and ozone in the lamp head cooling air.

Obsolete

© 2007 Nordson Corporation

reflector	Reflect and concentrate the UV light onto the substrate. Rolled from highly polished aluminum sheet metal or formed from borosilicate into elliptical or parabolic profiles. Elliptical profiles optimize the concentration of UV energy that is reflected by guiding the radiation into a tightly focused UV band while parabolic reflectors result in a flood of UV light. Holes or slots in the reflector allow cooling air to pass through. The holes or slots are engineered for size and location to provide both optimal and balanced airflow across the length of the bulb.
remote cooling fan (blower)	The cooling fan when it is mounted separate from the lamp head and ducted in to the lamp head.
RF	Radio Frequency. Any frequency between normally audible sound waves and the infrared light portion of the spectrum lying between 10 KHz and 1,000,000 MHz.
RF detector	Monitors RF levels in the vicinity of the UV system and signals the power supply to shut off the UV if RF levels exceed allowable limits.
screen	A wire mesh assembly attached to a microwave lamp head that allows UV to pass through but prevents RF from leaking from the unit.
short UV	Refer to UVC.
single	An electrode lamphead assembly with a cradle that supports only one bulb and one reflector.
shutter	An assembly designed to block UV light while passing cooling air.
solarization	The effect of the UV light on the quartz bulb. Over time, UV light and heat will cause the quartz to devitrify or revert back to a crystalline and porous state.
spectral output	The various wavelengths of light emitted from a UV bulb.
spectral output efficiency graph	A graph or chart showing the relative concentration of UV at various wavelengths for a particular bulb type. Typically, the concentration is provided as a normalized percentage where the energy is integrated over 10-nanometer bands to reduce the difficulty of quantifying the effects of line emission spectra.
starter	Used in electrode, ballast-based systems to vaporize the mercury. The starter puts a 3,000-4,000 volt potential across the bulb during start up and has an internal circuit that discontinues the potential when current is established.

Obsolete

© 2007 Nordson Corporation

starter bulb	Used in the start up of microwave systems to ignite the mercury vapor in the bulb.
static exposure	Exposure to a constant irradiance for a controlled period of time.
striking	The initial phase of the startup process where the mercury in the bulb is vaporized.
surface cure	When the UV material is cured only on the surface exposed to the UV.
tape test for measuring adhesion	When an X-cut or lattice pattern of 6 or 11 cuts are scratched through the UV cured material to the substrate. Pressure-sensitive tape is then applied over the cuts and removed. Pulling the tape away from the substrate will reveal the degree of adhesion. If any material between the lines is pulled off with the tape, the adhesion is poor. If the material remains, the adhesion is good. The recommended guidelines for testing and evaluation are documented in the ASTM spec D3359-95a under Methods A and B. Method A employs the X-cut and is used for coatings that are 5 mils or greater. Method B calls for lattice cuts and is recommended for coatings with 0-5 mils of thickness.
through cure	When the UV material is cured down to and including the material / substrate interface.
Threshold Limit Value (TLV)	The maximum exposure a person should receive over an 8-hour shift during a 40-hour week without producing an ill effect. Often reported in (mg / m^3) or ppm.
Time-Weighed Average (TWA)	Refer to Threshold Limit Value (TLV).
total energy	Refer to energy density.
transmittance	The ratio of the radiant energy passed through a body to the total radiant energy received by the body.
ultraviolet light	Radiant energy in the wavelength band of 100 to 400 nanometers.
UVA (315-400 nanometers)	The portion of the electromagnetic spectrum ranging between 315 and 400 nm. UVA represents the largest portion of UV energy and is commonly referred to as long UV. UVA is most responsible for skin aging and increased skin pigmentation. UVA is at the lower limit of sensitivity to the human eye.

Obsolete

© 2007 Nordson Corporation

UVB (280-315 nanometers)	The portion of the electromagnetic spectrum ranging between 280 and 315 nm. UVB is most responsible for reddening and burning of the skin and damage to the eyes.
UVC (200-280 nanometers)	The portion of the electromagnetic spectrum ranging between 200 and 280 nm. UVC is typically referred to as short UV.
UVV (400-445 nanometers)	The portion of the electromagnetic spectrum ranging between 400 and 445 nm. The V stands for visible UV.
vacuum UV (100-200 nanometers)	The portion of the electromagnetic spectrum ranging between 100 and 200 nm. UVV does not transmit in air.
viscocity	The state or quality of having a cohesive and sticky fluid consistency.
vitrification	The act of changing pure opaque quartz into clear non-porous quartz through a fusion process.
watt	One joule per second.
watt density	Refer to irradiance.
waveguide	Directs microwaves toward the bulb in microwave UV systems.
wavelength	The measured cycle length of a wave in the direction of propagation.

Obsolete

© 2007 Nordson Corporation

DECLARATION of CONFORMITY

Product: Cool Wave, Cool Wave 2 and Cool Wave 2 Plus

Models: CW-610V, CW2-610V, CW2+-610V, CW2I-610V, CW2+I-610V
CW2-410V, CW2+-410V, CW2I-410V, CW2+I-410V

Description: Ultraviolet curing equipment, designed for accelerated curing of UV inks, adhesives and coatings.

Applicable Directives:
2006/42/EC – Low Voltage Directive
2004/108/EEC – EMC Directive

Standards Used for Compliance:

EN/ISO12100	EN55011	EN61000-4-2	EN61000-4-5
UL61010A-1	EN61000-6-2	EN61000-4-3	EN61000-4-6
CSA22.2 No. 61010.1	EN61000-6-4	EN61000-4-4	SEMI F47-0706

Product Certificates:
ETL Certification for US and Canada
Quality System Certificate – ISO9000 through

Hallie Smith-Petee
Engineering Manager
Industrial Coating Systems

Date: 16 December 2014

Obsolete

Nordson Authorized Representative in the EU
Person authorized to compile the relevant technical documentation.
Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich-Hertz-StraBe 42-44
D-40699 Erkrath