



# DPL Speedy UV LED Ink Curing Proofer System User Manual

Congratulations on your decision to purchase this “**DPL Speedy**” UV LED Ink Curing Proofer System. Whilst we are sure you will not be disappointed with our product it is essential that a responsible person in your organization is delegated to read both this manual and the accompanying manual for the **DPL Speedy UV LED Ink Proofer** control system to ensure a full understanding of the system installation, start up, operation and maintenance.

**We wish to draw your attention to Section 5, Pre-start safety and other checks and Section 6, Regular service and maintenance checks** as whilst we have complied with all mandatory safety standards that apply under European Norm EN201 and in your country it is your responsibility to ensure that all safety devices/ systems remain undamaged and are not modified in any way so preventing their designed function.

In the event any of the content of this manual, or the accompanying manual for the control system, is not clear to you and further clarification is required do not hesitate to contact either our “DPL Agent” who supplied the machine, or contact us directly by either of the following means:

Email: DPL@DPL.DK

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Hejrevang 26 st th. DK 3450 Allerød Denmark

BEFORE ATTEMPTING TO INSTALL AND OPERATE THIS SYSTEM, IT IS IMPORTANT THAT THE NOTE AND LIMITATION SPECIFIED IN THE FOLLOWING TEXT BE UNDERSTOOD AND COMPLIED WITH.

NOTE:

1. DON'T OPERATE OR MAINTAIN THIS SYSTEM BEFORE YOU READ AND UNDERSTAND ALL INFORMATION IN THIS MANUAL.
2. DON'T OPERATE OR MAINTAIN THE PLC SYSTEM BEFORE YOU READ AND UNDERSTAND ALL INFORMATION IN THE MANUAL PROVIDED BY MANUFACTURER.
3. DON'T OPERATE OR MAINTAIN THE DRIVER CONTROL SYSTEM BEFORE YOU READ AND UNDERSTAND ALL INFORMATION IN THE MANUAL PROVIDED BY MANUFACTURER.
4. THE LAST INFORMATION ABOUT THIS SYSTEM IS SUBJECT TO THE FINAL CONFIRMATION FROM US

## **General Index**

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01	Safety Introduction
02	Installation Introduction
03	Shipment and delivery
04	Unpacking and delivery inspection
05	Pre-start safety and other checks
06	System specification and control information
07	Operation

## **SECTION 01- SAFETY INTRODUCTION**

LIMITATION 1: THIS SYSTEM IS DESIGNED FOR DRYING (AS CALLED AS CURING) UV LED CURABLE INK OR COATING LACQUER. THE PROCESSING OF ANY OTHER TYPE OF MATERIAL IS PROHIBITED. NOT MOVE THE SYSTEM IN ANY METHOD WHEN SYSTEM IS IN OPERATION. DON'T TOUCH INSIDE OF LAMP HOUSE WHEN THE SYSTEM IS IN OPERATION. ALL DOOR OF CABINET SHOULD BE CLOSED BEFORE SYSTEM IN OPERATION. ALL SWITCH SHOULD BE UNDER GOOD CONDITION. DON'T TOUCH ANY INK OR LACQUER WITHOUT HAND COVER, FACE PROTECTOR AND EYES' PROTECTOR. OTHER SAFETY ITEM FOR LED LAMPS ARE ALSO REQUESTED FOR OUR SYSTEM.

LIMITATION 2: LED LIGHT is dangerous for skin and eyes. Protect skin with specific LED proof cloths, protect eyes with LED proof glasses.

LIMITATION 3: THIS SYSTEM IS DESIGNED TO OPERATE FROM A FACTORY ELECTRICAL SUPPLY OF 100-240 VOLTS, 50 /60 Hz THE SUPPLY VOLTAGE MUST NOT VARY BY MORE THAN  $\pm 10\%$  OF THIS STATED VALUE AND THE FREQUENCY MUST NOT DEVIATE BY MORE THAN  $\pm 1\%$  Hz FROM THE STATED VALUE. THE USER MUST PROVIDE AN APPROPRIATE POWER SUPPLY.

LIMITATION 4: THIS SYSTEM HAS AN INSTALLED ELECTRICAL CAPACITY OF 3.5 KW WITH A FULL LOAD CURRENT UP TO 35 AMPRES. THIS SYSTEM IS PROTECTED BY OVER CURRENT DEVICES.

LIMITATION 5: THE SOUND PRESSURE LEVEL MEASURED AT WORK STATION ACCORDING TO STANDARD EN 13023:2003 IS 67 dB. MUST STOP SYSTEM WHEN NOISE IS HIGH.

LIMITATION 6: THE LAMP HOUSE OF THIS SYSTEM INCLUDE A BOTTOM GLASS. DON'T TOUCH BROKEN PIECE WITHOUT HANDS PROTECTION.

LIMITATION 7: THE OPERATOR SHOULD WAER IN STANDARD SAFETY. OPERATOR MUST PAY ATTENTION TO SOLVENT OF ELECTRIC-FORMER.

LIMITATION 8: THE SYSTEM IS INTENDED TO BE USED IN CONTROLLED ENVIRONMENT, e.g. DUST AND WATER PROOF CLEANING SHOP.

LIMITATION 9: THIS SYSTEM SHOULD BE INSTALLED IN CLEAN, DUSTPROOF PLACE, NOT ALLOWED IN ANY DANGER PLACE AS FLAMMABILITY, EXPLOSION HAZARD AND SO ON.

LIMITATION 10: ANY FLAMMABILITY, EXPLOSION HAZARD MATERIAL CAN NOT BE USED AS CLEANSER.

## **SECTION 02- INSTALLATION INTRODUCTION**

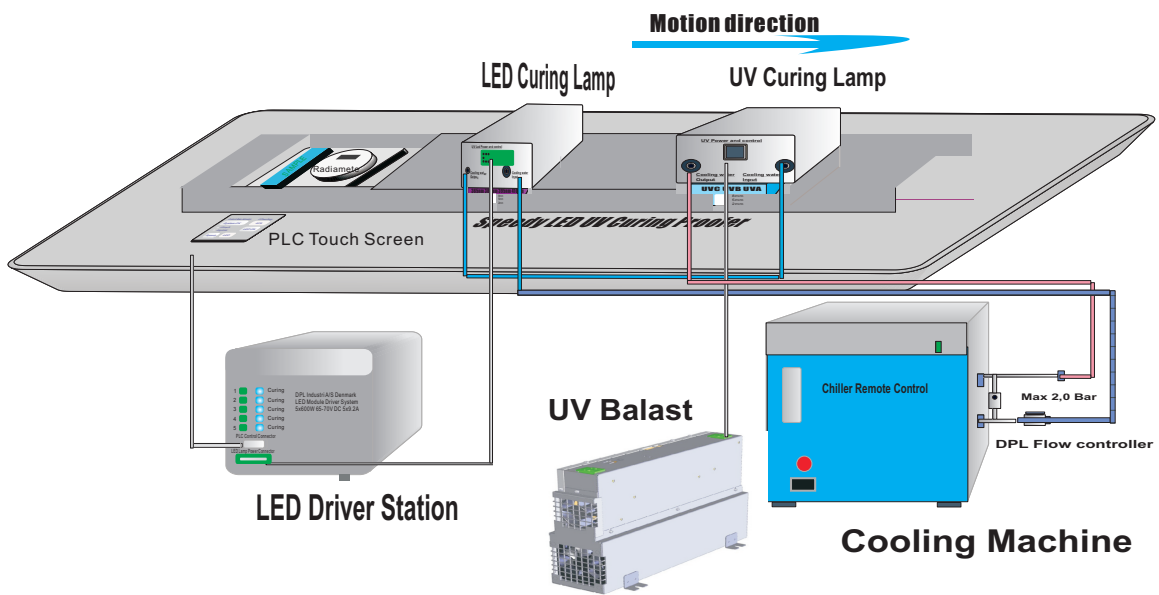
### **A. System installation drawing**

This system should be installed on a standard production base. The user should provide stable electric power, clean air, and water with a temperature less than 25°C.

The temperature of the workshop should be from 18°C to 26°C (the lowest temperature is 15°C, the highest temperature is 30°C), suited with a waste gas exhaust system.

The system installation drawing is as follows:

### **DPL Speedy UV LED Ink Proofer System Layout**



**Note: Water chiller need 6% XLI. The XLI should be checked in 1 year.**

### **SECTION 03- SHIPMENT AND DELIVERY**

Systems exported from our factory are packed with suitable sea transport material, treated with anti-corrosion or anti-corrosion grease, either first mounted and substantial wooden pallet to which vertical sides, ends and a top are added to form a six size sided wooden case, or mounted on a substantial wooden pallet only. With either method, which is at the discretion of the buyer, the wooden case containing the machine or the wooden pallet carrying the machine, is then loaded into a containers and sent to the port.

When the shipment arrives at its port destination it will either be delivered to the local “DPL agent” or be delivered directly to the customer.

In the event that the shipment is delivery to the local “DPL agent” then it will be his responsibility to either remove the case from the container and then remove the machine from the case, or remove the machine and the palter from the container and then separate the machine from the pallet, unless alternative arrangements have been made.

In the event that the shipment is delivered directly to the customer then it is the customer’s responsibility to arrange for the above which may require facilities beyond those normal to the customer. If special facilities are required these must be organized before delivery to the customer takes place as delays in unloading the container can prove to be expensive and will be the account of the customer.

## **SECTION 4 –UNPACKING AND POST DELIVERY INSPECTION**

Note this only applies if the shipment has been delivered directly to the customer and has not been previously delivered to the local “DPL Agent”

Where the system has been shipped in a wooden case allowance must be made for its weight which must be added to the weight of the machine. For example, system has a net weight of 52kg, therefore ensure that any lifting equipment used to lift the system and packing case simultaneously has a minimum lifting capacity of 70kg.

Once the packing case and its contents are removed from the container check that there is no serious damage to the case which in turn could mean damage to the machine. Should substantial damage to the case be found it is important that no further unpacking take place and the following action is taken.

- 1.-If the system is delivered directly on a CIF Basis contact “ DPL” immediately and advise them of the damage and they in turn will arrange for the insurance company to make the necessary inspection.
- 2.-If the system is delivered directly on a FOB basis then the insurance should have been arranged by the customer, or his local “DPL Agent”, either of which should immediately contact his own insurance company/broker and advise them of the damage.

Assuming the packing case is intact and without damage it may be dismantled by first removing the top, then the sides and the ends, so leaving the exposed machine on the pallet which formed the base of the packing case.

After removing the sides and top of the wooden case, or in the event that the system was shipped on a pallet only, remove the plastic sheets which cover the machine and carry out a visual inspection for any damage to the machine which could have occurred during its passage Shantou to the customer. If any serious damage is found execute the same actions as referred to in items 1 and 2 above in the section.

Assuming no damage is found it is now necessary to release the fasteners holding the system to the pallet. The fasteners are positioned in the holes in the lower section of the machine base which are normally used to accommodate the resilient feet on which the system is placed in service.

The system is now in a position where it may be lifted clear of the pallet and placed in its pre-prepared site. Double check that all loose items, the spare parts package, the tool box and the manuals has been removed to a secure location.






Please note that when disposing of the wooden case and other packing material which arrived with the system it is important that the various laws which apply in your country regarding the “Disposal of Industrial Waste” be complied with.

## **SECTION 5 –PRE-START SAFETY AND OTHER CHECKS**

NOTE- THE FOLLOWING CHECKS ARE TO BE MADE WITH THE ELECTRICAL POWER TURNED OFF.

### 06-01 Warning Signs

The Primary check is to ensure that all personnel involved in operating, setting and servicing this machine fully understand the various warning signs place on the machine. See the following text for details of warning signs and their meaning.

	This symbol indicate a possibility of threatening hazard to the life and health of person by Electric power. Man should switch off the power when they maintain the system.
	This symbol indicate a possibility of threatening hazard to the life and health of person by UV light
	This symbol indicates a direct threaten hazard for the life and health of person as the result of contact with electricity. Failure to observe these instruction will result in sever harmful effects through fatal injuries.
	This symbol indicates here is connect the earth
	This symbol indicates that gate should be closed and be careful for your hands.

## **SECTION 6 SYSTEM SPECTION AND CONTROL INFORMATION**

**Speedy UV LED curing proofer** use sliding block carry ink sample or radiation meter by Linear Motion system with servo driver +Integrated PLC control to reach precision measurement at speed from 4-300m/min. Our clients set testing speed and UV Energy on Touch screen, Sliding block with ink sample run automatic at the setup speed when it pass the curing area, in the meanwhile lamp will be automatic reach the setup energy. After curing, sample will be automatic return back to the start position. **Speedy UV LED Curing Proofer** provide reel-time picture for your curing result same as your printing machines.

According to different application, **Speedy UV LED Curing Proofer Series** includes following item No:

### **1.Speedy-LEDM**

Including: 1x LED lamp with 2xMulti-Wavelength LED Modules,air cooling, 1x LED driver with 2xDriver Units, 1x PLC+Touch screen, 1x Linear Motion System up to 300m/min  
curing area: 82mm  
wavelength: 365+395+410 nm  
Peak Energy output: up to 26w/cm<sup>2</sup>

### **2.Speedy-LEDS**

Including: 1x LED lamp with 2xsingle -Wavelength LED Modules, air cooling,1x LED driver with 2xDriver Units,1x PLC+Touch screen, 1x Linear Motion System up to 300m/min  
curing area: 82mm  
wavelength: 365 or 385 or 395nm  
Peak Energy output: up to 26w/cm<sup>2</sup>

### **3.Speedy-UV**

Including: 1x cold UV lamp, 1x Ballast, 1x Chiller, 1x PLC+Touch screen, 1x Linear Motion System up to 300m/min  
curing area: 100mm  
Energy output: up to 140w/cm

### **4: Speedy-UVLED**

Including: 1x LED lamp with 2x Multi-Wavelength LED Modules,1x UV lamp, 1x LED driver with 2xDriver Units, 1x Chiller, 1x PLC+Touch screen, 1x Linear Motion System up to 300m/min

LED curing area: 82mm, UV curing area: 100mm  
LED wavelength: 365,385,395nm  
Peak Energy output: up to 26w/cm<sup>2</sup>  
UV energy: up to 140w/cm

### **5. Speedy LED-F:**

including 1x LED Lamp with 4x LED modules with different wavelength LED Chip, 1x LED module at 365nm, 1x LED module at 385nm, 1x LED module at 395nm, 1x LED module at 410nm, you can switch on/off for each LED module. Whole curing area is 60x164mm, each module curing area is 60x41mm. one LED driver station with four driver units to each



LED module, air cooling, , 1x PLC+Touch screen, 1x Linear Motion System up to 300m/min

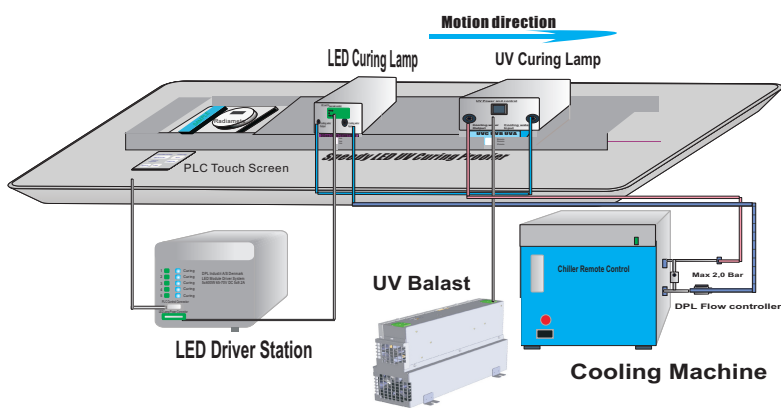
**6. Mini Speedy LED:**

Including: 1x LED lamp with 1xMulti-Wavelength LED Modules, air cooling, 1x LED driver with 1xDriver Units, 1x PLC+Touch screen, 1x Linear Motion System up to 120m/min curing area: 41mm wavelength: 365+395+410 nm Peak Energy output: up to 18w/cm2

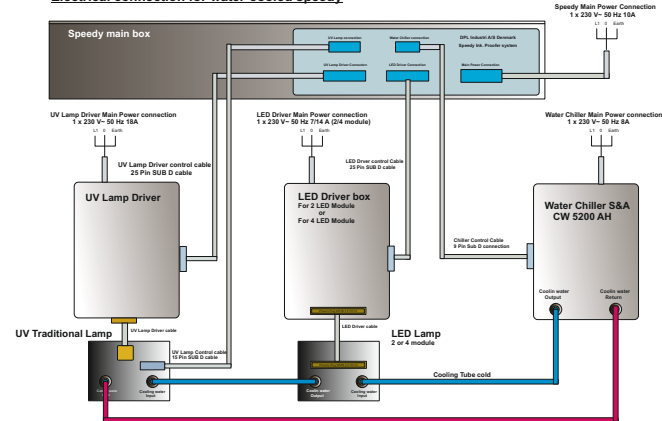
**7. Mini Speedy-LEDS**

Including: 1x LED lamp with 1xsingle -Wavelength LED Modules, air cooling, 1x LED driver with 1xDriver Units, 1x PLC+Touch screen, 1x Linear Motion System up to 120m/min curing area: 41mm wavelength: 365 or 385 or 395nm Peak Energy output: up to 18w/cm2

**DPL Speedy UV LED Ink Proofer System Layout**



**Electrical connection for water-cooled speedy**



**NOTE: Before start on Lamp, must check chiller is on working condition. All water chillers provided by DPL are equipped with automatic Flow Controller, which will check the flow pressure/temperature information and send to PLC.**

**Water chiller need 6% XLI. XLI should be checked within 1 year.**

## 6.1 Diversified Curing Light-LED

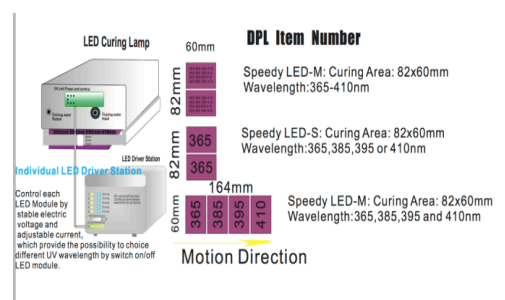
**Note:** DPL Speedy UV LED Ink curing Proofer system provide UV light curing source and/or LED light curing source due to client's request.

### 6.1.1 LED Lamp house

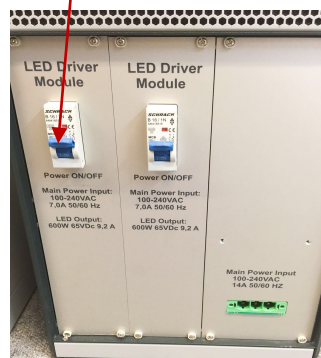
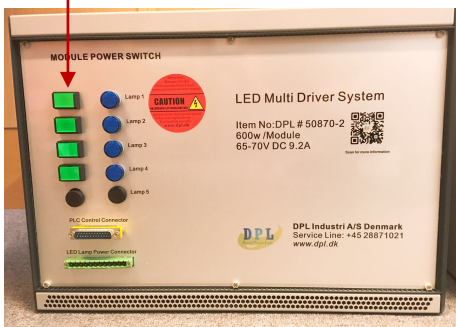
**Note:** Don't open the lamp house without DPL engineers' help.



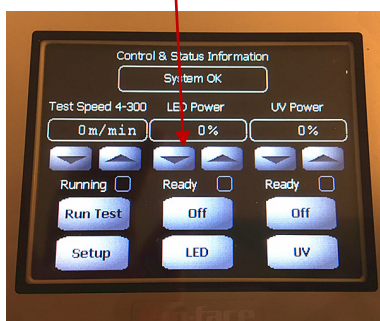
DPL Speedy UV LED Curing Proofer use our own design eAsycure LED Lamp house, which include LED Modules, Chilling plate, Chilling pipe, LED Modules power printed circuit board and cable, protect bottom window.



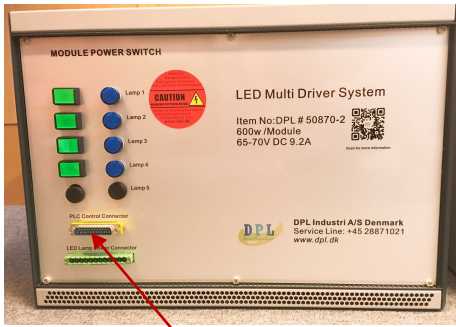
According to client's application, DPL provide LED Module with different wavelength from 365nm to 405nm. In this system, client choice to use different wavelength LED light through turn on/off the **Green Switch** on the front side of LED driver, or **BLUE Switch** on the backside. See the following picture:



Client can adjust curing Energy through touch screen.



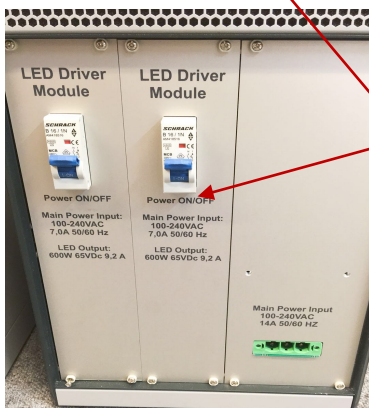
## 6.1.2 LED Driver



**Note: Switch Off the main power before any replacement. Check all connection is under good condition before operation.**

**DPL Speedy UV LED Curing Proofer System** use a new Led multi drive technology to control our high power led curing lamp serial. With this multi drive system, the uniformity and radiation will be controlled and keep stability for each led power module.

The Led UV radiation will be linear regulated up to 26W/cm<sup>2</sup>.



The led module (41mm x 60mm), will be regulated by a separate driver up to 600W, which is a UV power 146W/cm.

Each Led module can be turn on/off by the switch on backside or front side, in order to save lifetime for the led module. This function can be used, in application with small curing area.

The Led multi driver system, can be use with up to 5 drivers of each 600W, totally 3000W.

### Technical Specification:

LED Driver Station 5# (DPL Code: 50870)		3 pieces of Power Modules		4 pieces of Power Modules		5 pieces of Power Modules	
Input	Mains Voltage	1 phase 100V-240Vac					
	Input line freq.	50-60Hz					
	Input current.	21A	28A		35A		
	Power Factor.	0.95 at 100% power					
	Standby power	<2.5w					
Current regulation	0-10V regulation or PWM regulation						
Output	Output power.	1800w	2400w		3000w		
	Output Voltage	66v DC					
	Output current	0.5-9.15 A					
Protections		Overload, Overcurrent, short circuit, Temperature					
Operation Temp:		0 to 40 C					
Dimensions:		450mm x 380mm x 320mm					

## **6.2.Diversified Curing Light-UV**

**Note:** Don't open the lamp house without DPL engineers' help.

**DPL Speedy UV LED Curing Proofer** use our own design eAsycore Cold UV curing system with 1x set of 100mm UV lamp house, 1 set of 3kw ballast.

### **6.2.1 DPL Cold UV lamp house**

DPL Pattern Design Cold UV lamp house

Compared with other UV lamp house in the market, DPL pattern design lamp house is specially designed for Cold UV curing system. It help improving curing temperature and lamp's lifetime.

#### **Feature of DPL Cold UV lamp house**

Cold UV Curing Temperature

UV lamp output includes 60% IR energy, a normal metal reflector reflects IR energy out of the lamp head/house, and heat up the touch temperature between your base material and lamp head. Every DPL cold uv lamp head/house is equipped with the specially coated reflector, which can

absorb 90% IR from your lamp and transfer to the chilling system, so the surface temperature of your printing material is the only 5-10C degree higher than your environment temp.

#### **High UV Energy Output Efficiency**

As you know that, more than 60% output of UV lamp is only IR, means you can only get 80w/cm UV energy even from a 200w/cm UV lamp. All DPL lamp head/house use "Energy Focus" design. The output UV energy will be focused into a narrow line about 5-10mm width through your web way, which can increase curing efficiency by 30% up.

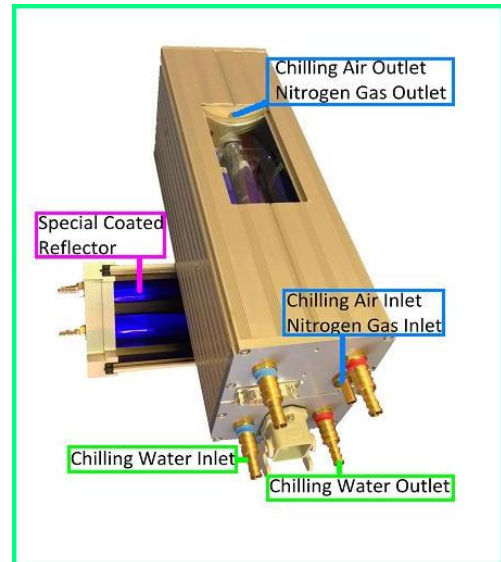
#### **Multi-input Lamp Source and Chilling Source**

DPL UV Lamp head/house is equipped with multi-channels, so our clients can use water chilling as the basic chilling source, but when they print or coat on the thermally sensitive material, they also can use "chilling air input/output" port in our lamp head. Chilling air input/output channel is also suitable for Nitrogen air solution.

#### **Ozone Free**

High concentrations of ozone near ground level can be harmful to people, animals, crops, and other materials. Ozone can irritate your respiratory system, causing you to start coughing, feel an irritation in your throat and/or experience an uncomfortable sensation in your chest.

With our patent design of UV lamp house, DPL UV curing system is a "Ozone free" system, our client dont need install expensive "ozone exhaust" system, their worker can work in a clean "Ozone free " production.



**6.2.2. Ballast:** DPL UV curing system is equipped by "High Frequency electric power station", which will improve UV curing outlet energy and reduce "stand-by" energy. For example: UV curing system is equipped by Transformer at 50HZ: UV lamp stand by energy is 40%.





UV curing system is equipped by Electric power station at 100HZ: UV lamp stand by energy is 28-35%.

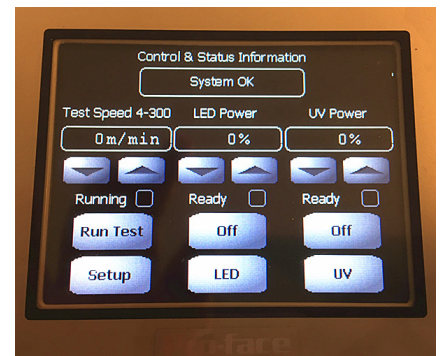
DPL UV curing system is equipped by High frequency electric power station at 30000-100000HZ: UV lamp stand by energy is 16-25%.

**Please see Ballast user manual in the attached file.(optional)**

### **6.3PLC Control & Touch Screen**

**DPL Speedy UV LED Ink Curing Proofer System** use PLC control system which has a full control over LED-LAMP, LED drivers, UV-lamp, UV Ballast and chiller. By speed power control(TACHO), the curing energy is synchronization with printing machine speed. The speed control slope can be adjusted from 0-300m/min.

Client also can choice UV curing or LED curing or both, and setup or adjust the Curing energy and speedy with  or  on touch screen. (see the right picture).

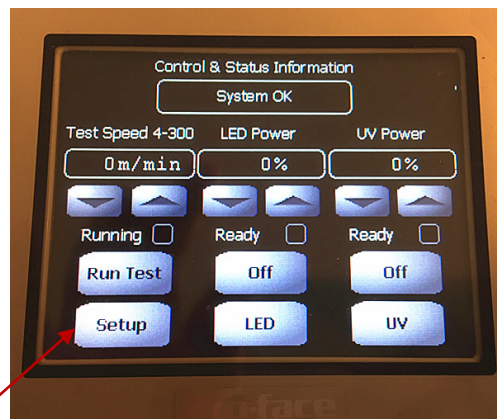


## SECTION 7: OPERATION

**Note: Don't turn on LED/UV System until check the chiller is on working condition.**



After switch on PLC Control system, it shown as the left picture. Touch the screen, system start to work and entry **Control & Status Information menu** (See the following picture).

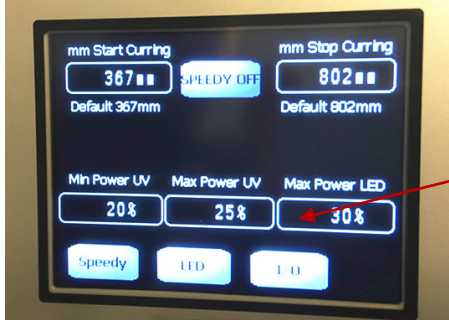


### 7.1 Setup

Touch "Setup" on the touchscreen, system entry setup menu, see the following picture.

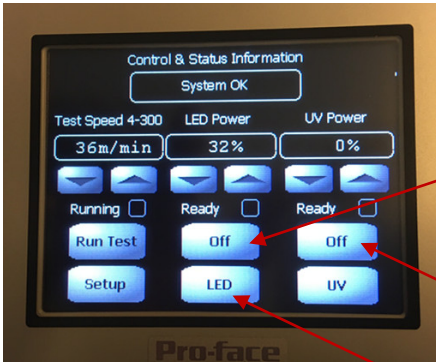


This function only provides to experienced engineers or DPL engineers. Contact DPL ([dpl@dpl.dk](mailto:dpl@dpl.dk) or +45 88271021) for password when you need password for this function.



In Setup menu, clients can setup the value of **Min UV curing energy, Max UV curing energy, LED curing energy and other manufacturing information.**

## 7.2. Choice Curing Source

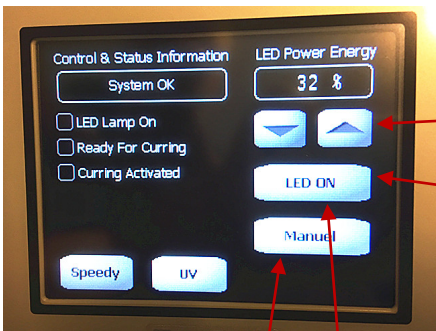




See the left picture, client can choice UV curing or LED curing source or both.


Touch On/Off button under “LED Power”, turn on/off LED lamp.

Touch On/Off button under “UV Power”, turn on/off UV lamp.

## 7.3 LED curing energy setting



Touch LED Button under “LED Power”, setup the value of LED Power Energy, adjust it by  or 

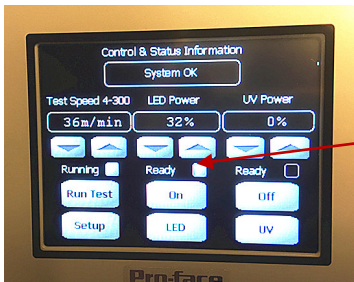
Choice  Button  
LED Curing system is turn on.

Note: **Manuel Function** is for controlling LED curing lamp with Remote.

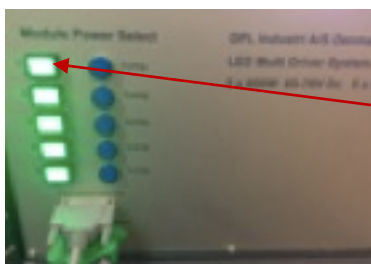
After client choice **LED ON**, system will automatic check the signal from flow sensor of Chiller.

Also the temperature sensor inside of LED lamp House.

If water flow and Lamp house temperature is under working condition, the system will be shown as following:



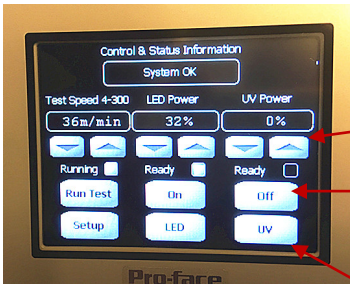
LED Lamp On and Ready for Curing will be light on.



LED Driver station will be shown as following:

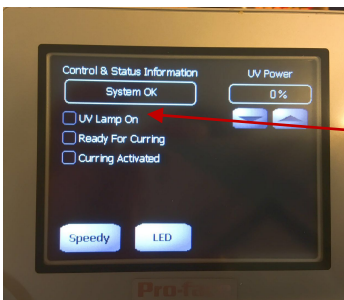
The **Green Light** of each Power Module will be on.

## 7.4 UV curing energy setting



Touch UV Button under “UV Power”, setup the value of UV Power Energy, adjust it by  or 

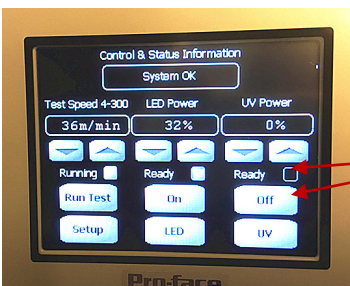
Choice ON/OFF Button UV Curing system is turn on.



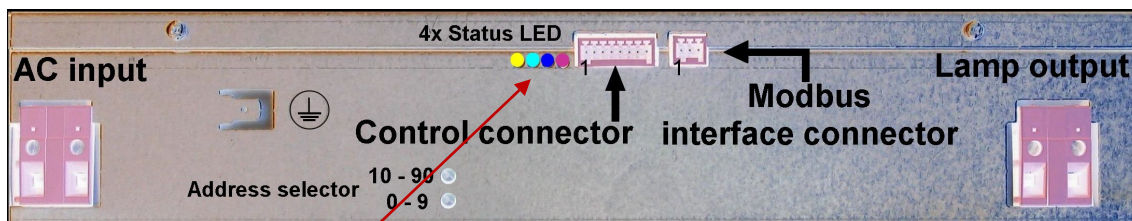
Touch **UV** button, entry UV energy setting menu.  
(See the left picture)

When **UV Lamp ON**, system will automatic check the signal from flow sensor of Chiller.

Also the temperature sensor inside of UV lamp House.

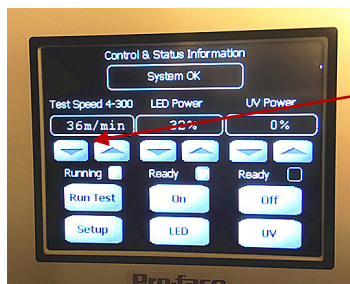


If water flow and Lamp house temperature is under working condition, the system will be shown as following:  
UV Lamp On and Ready for Curing will be light on.



Optional: The **Blue light** of UV ballast will be on.

## 7.5 Curing Speed Setup



Speed is adjusted by   (See the left picture)

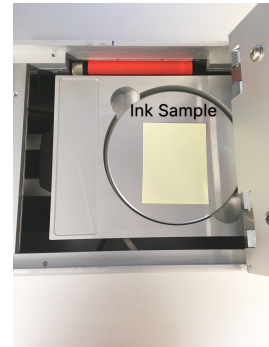


## 7.6 Sample Plate



Put Ink sample on Sample plate with small adhesive tape, see the left picture.

Put sample plate in the machine. See the right picture.



Ink Sample: paper/film  
Radiation Meter



Coating Sample:  
paper/film/wood/plastic

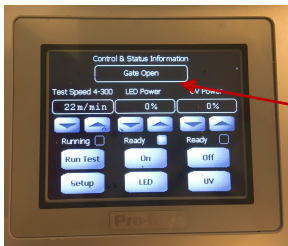


Coating Sample:  
3D Module

**Note: We provide different type of sample plate according to client's application.**

## 7.7 Safety Cover

**Note: Close the safety cover before run test. Don't Open it when test is running.**

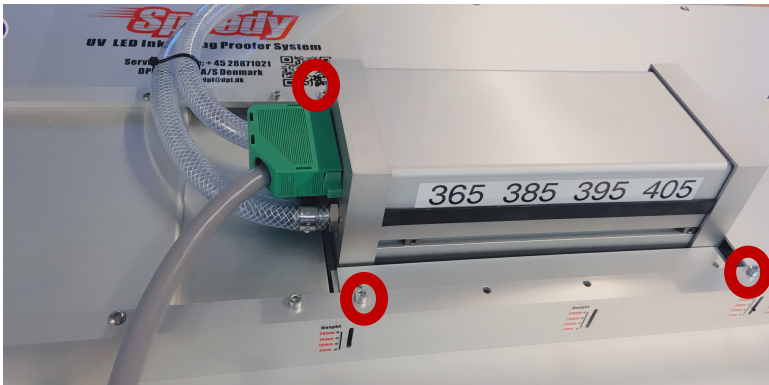


If the cover is open, it will show "Gate Open" on touch screen, and system cannot be start.

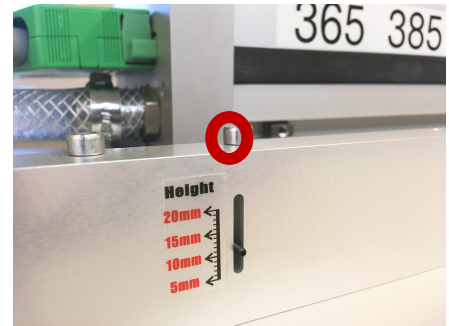


**Note: If the cover is open when test is running, the system will automatic stop and show "Gate open" on touch screen, you have to switch off the main power and start the power again.**

## 7.8 Adjust curing distance



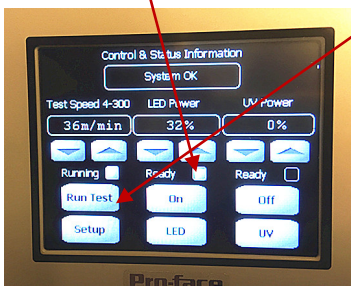
There are four screws on both side of lamp, see the red mark in the left picture.



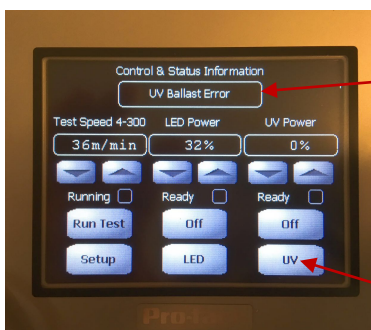
Adjust these four screws in the picture, curing distance from lamp to ink sample can be adjusted from 5mm to 20mm.

### 7.9 Run Test

After Ready mark is on, touch **Run Test** on touchscreen, the system run a test.

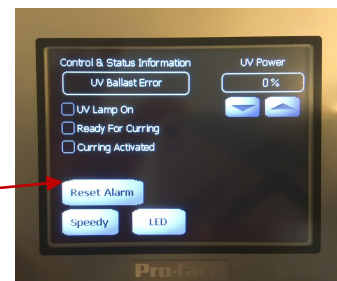


### 7.10 System Failure



System failure information will be shown on touchscreen under Control & Status Information.

After solve the failure, if it's UV lamp failure, touch **UV**, you will entry into failure details menu, and touch **Reset Alarm**. If the failure is solved, it will show "System OK"



Touch **Speedy**, go back to the main menu, system is ready for running a test.

