

CURING UNIT

PHOTOPOL DIGITAL



USER AND MAINTENANCE MANUAL



PHOTOPOL

1. DESCRIPTION

1.1 PURPOSE OF USE

PHOTOPOL Digital has been expressly designed to carry out curing operations under the effect of ultraviolet rays. The system has been developed to suit with the requirements of Dental, Jewellery and Rapid Prototyping laboratories for the hardening (post-curing) process of objects manufactured with 3D DLP printers which use liquid resins and for the final stabilisation of photosensitive composites. The UV spectrum range achieved by this unit corresponds to the specific value of those resins (from 320 to 450nm) thus assuring to reach the complete result.

The curing process of **PHOTOPOL Digital** is performed in a wide working chamber, the radiation sources have been uniformly distributed on all walls assuring to reach the objects from any direction.

All functions are controlled and run by an electronic microprocessor circuit. The operating software features a logical user interface providing ease of use and immediate understanding. All operating data are always clearly displayed and can be modified directly on the full-colour touch screen.

The unit works under independent condition, it may not be supervised by the User himself therefore no defined working place is required.

1.2 IMPROPER USE

Do not use the UV radiation performed by this unit for any different purposes of use not herewith stated; the manufacturer will assume no liability further to improper use of the unit for any damage which could incur to persons, animals or things.

2. TECHNICAL SPECIFICATIONS

Width	450 mm (500 with the connections)
Depth at the base	360 mm
Height	215 mm
Net Weight	9,0 kg
Gross Weight	11,0 kg
Rated voltage	230VAC +/-10% – 50/60 Hz
Delayed effect fuses	2 ø 5x20 - 3.15 Amp
Absorption	150 W – 0.75 Amp
Altitude	Up to 2000m slm
Operating temperature	from 10 to 40°C
Humidity (for storage, too)	from 20 to 80%
Storage temperature	from -10 to +70°C
Protection level	IP42
Acoustic pressure LAeq, Tp	<70 dB(A)
Pure UV LED (violet)	4 circuits à 16 LED
Near UV LED (blue)	2 circuits à 16 LED
Chamber useful size	250 x 250 x 120h
Number of available programs	100

3. TECHNICAL REFERENCE GUIDELINES AND TEST REGULATIONS

The light-curing furnace is mass-manufactured by DENTALFARM in compliance with technical and safety rules in force, as provided for by the 2006/42 EEC Community Directive on machinery and following amendments and integrations. PHOTOPOL Digital complies with the Directives EMC 2014/30/EU and LVD 2014/35/EU.

Careful inspection and full routine testing is carried out singularly on each machine which is further tested by an automatic test installation (Chauvin Arnoux C.A 6155) carrying out in sequence several tests and it prints a report assuring compliance with the fixed limits.

According to International Regulations, this unit has been classified as AEE (electric and electronic device, whose correct operation depends on electric currents and electromagnetic fields) and as a consequence, at the end of its lifetime, it can not be treated as normal waste material but it must be disposed separately, complying with the Directive 2012/19/UE.



4. GENERAL PRECAUTIONS

- Read carefully the present manual before carrying out any starting, operating or maintenance operation on the machine
- The final User of the machine is an adult, skilled and well trained professional on the specific curing process and risks involved and not merely an occasional worker
- Safety of the User depends on the skillness, on the good sense and on the caution when using the machine; for this reason, it is of utmost importance to know in detail the allocation and the function of all the controls
- During the transport and the following storage do not turn the unit upside down and conform to the directions printed on the box
- In consideration of low weight of the unit, handling operations can be carried out by a single Operator
- Do not install and do not use the machine in potentially explosive areas
- The assembly components do not have any contraindication for persons with implantable active or passive devices, in any case we recommend to contact beforehand your Doctor
- Do not tamper the electrical wiring system of the machine
- The built-in safety mechanisms and the warning labels of the machine shall in no way be removed or modified
- Check regularly all the parts which tend to wear out easily due to their specific working conditions
- Check regularly that the feeding cable and most specifically the ground connections are intact and not damaged
- Do not allow unauthorized persons to try to repair the machine
- No modification to this unit is allowed unless previously authorised
- Should any inconvenience or malfunction occur, pls contact our Technical Servicing
- Residual risks: on the unit some warning or precaution symbols are affixed you will have to comply with according to their meaning as follows

Risk of misunderstanding	Risks deriving from the exposure to the UV rays and from materials handling		Electrical hazards	Risk of burning
				
Read through the User Manual for any information and to restrict any risk	Wear goggles as protection against UV radiation which may harm your eyes		Parts under tension, do not remove the protections	Presence of hot surfaces
	Wear safety gloves in case of hypersensitivity in resin handling			

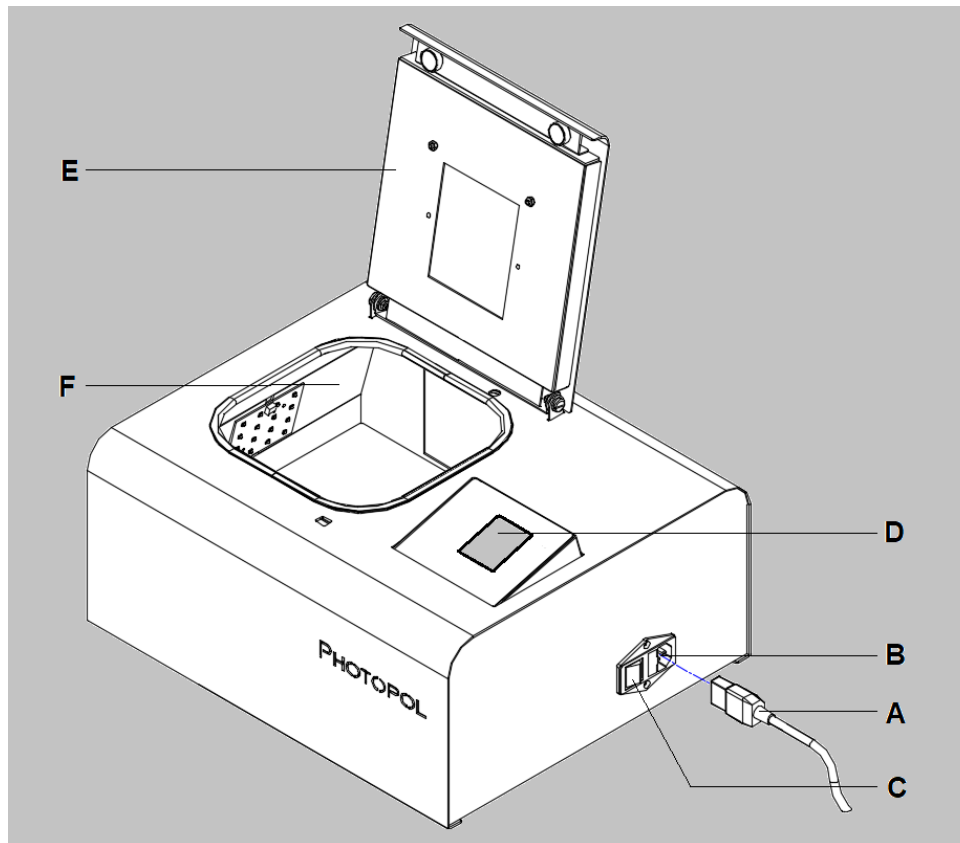
5. INSTALLATION INSTRUCTIONS

/!\ ATTENTION

Installation of this machine is quite easy but it must be carried out paying utmost attention in order to avoid any mistake which may originate problems during operation, inconvenience or even damages.

Store the original package of the unit for any further handling or shipment under extraordinary maintenance intervention. Remove the protective foils all around the metallic housing and inside the transparent shelves positioned at the inside of the working chamber.

1. Place the machine on a suitable work bench, in a stable position appropriate to its weight, at least 10cm away from the wall to allow the necessary space for the connections. During operation no vibrations are originated, therefore no additional precautions are required at installation
2. Check the plate data, referring to the electrical feeding and the absorption then feed the unit through a protected line by 10Amp magneto-thermic bipolar switch and circuit breaker with 30mA sensibility (devices not part of the supply)
3. Connect the feeding cable (A) to the socket (B) placed on the right side panel and plug the other end into an approved 230v AC - 50Hz socket with ground connection
4. Switch on the unit (C), the display (D) will light up.



- A = Electric cable
- B = Feeding plug
- C = Main switch
- D = Touch display
- E = Tilting lid
- F = Radiation chamber

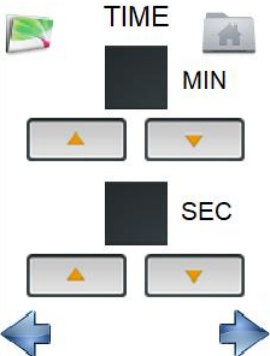
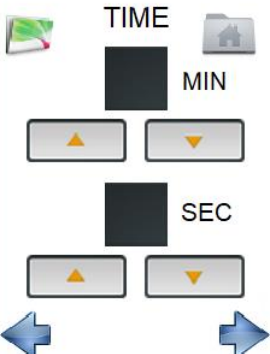
6. DESCRIPTION OF THE WORKING FUNCTIONS

All the functions of the machine can be selected, stored and operated by means of the touch display. The software will show some consecutive screenshots featuring all the necessary parameters to execute the most suitable working cycle and afterwards to launch and store the program.

	On startup the PHOTOPOL mark will appear, touch the screen to enter the main menu where the three icons are visible
  	SETTINGS To set the software language PROGRAM STORAGE Where the cycles entered by the Customer are stored INFORMATION How to contact Dentalfarm
	SETTINGS Screenshot First of all check the preset language: touch on the language identification flag (the selected icon will light up). Available languages are: ITA – FRA – ENG – DEU – ESP HOME icon up on right back to the main menu
 ver. 1.0 DENTALFARM SRL VIA SUSA 9/A 10138 TORINO -I TEL. +39 0114346632 info@dentalfarm.it www.dentalfarm.it	INFORMATION screenshot Showing the data of the installed software and the references to contact Dentalfarm HOME icon up on right back to the main menu

7. SETTING THE WORKING CYCLE

	From the main menu select the central icon PROGRAM STORAGE
PROG  RIGHT ARROW to next page	Find a free number to be attributed to the program (at the beginning they are all free, once the cycle contains some stored data the V combined to the number will turn from green to red), START will appear allowing the immediate execution with no need to browse all parameters
When setting a working cycle some important parameters have to be selected: 1. Environmental condition (namely the quality of site where the curing will be carried out – highly important for resins in class IIa) 2. Applied voltage (speed and intensity rate the LEDs will be working at) 3. Working time (length of the irradiation step)	
 WORKING CONDITIONS	The preparation of a polymerization cycle starts with the choice of the WORKING CONDITIONS, the selected symbol will turn darker. Identifying a cycle under atmosphere (no special condition) Identifying a cycle under protected atmosphere (the flask is filled up with inert gas - nitrogen) RIGHT ARROW to next page
 POWER	Select POWER, the selected symbol will turn darker Slow and progressive starting – highest power preventing the outer surface from hardening before the light can actually reach all parts at the inside. Slow and progressive starting – reduced power ideal for objects of much reduced thickness Immediate start – highest power ideal for dark objects RIGHT ARROW to next page

	Select TIME, data will be shown in the frame above: MINUTES are entered in the upper section SECONDS are entered in the lower section Once all the parameters have been entered the cycle is automatically stored (adjutable at any time) RIGHT ARROW to next page
	START CYCLE, press the green key to start the treatment LEFT ARROW back to menu
At this step the cycle has been automatically saved with the number selected at the beginning. Pressing the symbols on the top will lead back to the main menu and access to new programs. Press the green key to start the cycle, the display will show the operation screenshot.	
	Screenshot of the operating cycle Both the count-down and the residual time are steadily shown Should you decide to abort the cycle, press the red key
	Screenshot of end cycle As the program is definitively concluded, a sequence of sound signals will be emitted. It is possible to launch again the same program but only provided the lid has been opened and closed (the central key will turn again into green) or select the HOME icon at the bottom to go back to the main menu.

8. INSTRUCTIONS FOR USE

1. Switch on the main switch, the display will light up and the unit is ready to input the operating data, touch the display to access the main menu
2. Click the central icon **ARCHIVE**, select the desired working cycle or create a new one **if the cycle had already been stored and data should not be modified, the start up procedure can be activated right away by pressing START at the top**
3. Open the lid to access the inside of the working chamber and position the objects to be treated, then close it completely (in case the lid is not fully closed the working cycle will not start)
4. Press the green start up key.



When the lid is opened the cycle will be immediately interrupted and once closed it will restart from the step it had been cut off.

Once the cycle is definitively completed, the unit will emit a sequence of sound signals. When the lid is opened to pick up the object, parameters will be reset to zero and the furnace is ready for a new cycle.

In case of voltage drop during the cycle, it will cause it to stop permanently and can not be recovered, as a consequence it is recommended to protect the unit with an Uninterrupted Power Supply (UPS) to avoid wasting the objects as a result of an incomplete treatment (in any case a structural verification of the treated objects is always recommended).

9. CHECK OF LED CONSUMPTION

The partial or complete deterioration in performance of the UV LEDs will cause the failure or partial curing of the treated objects, the result is clearly visible (the object is not hardened or moist) or emerging in the following treatments (finishing). To help prevent this problem it is necessary to check always the efficiency (test cycle and visual inspection of the treated objects). In addition the software manages a control system on LED consumption.



As the deterioration level is approaching, a warning symbol will appear on the display; operation is still allowed by slightly extending the working time. Spares replacement is promptly recommended.



After an additional short period, a ban symbol is shown locking the unit and forcing the technical intervention.

10. MAINTENANCE

<u>⚠</u> <u>ATTENTION:</u>	Before carrying out any maintenance operation inside the machine, unplug the electric cable from the socket; in such a way the machine will be completely insulated from the electric wiring system. If you still have any doubts, difficulties or any possibility of mistake, contact our Technical Service to avoid any risks or damages. Any technical intervention involving to remove the protections and to manipulate the machine internal components can be carried out exclusively by skilled personnel or staff trained by the Manufacturer.
---	--

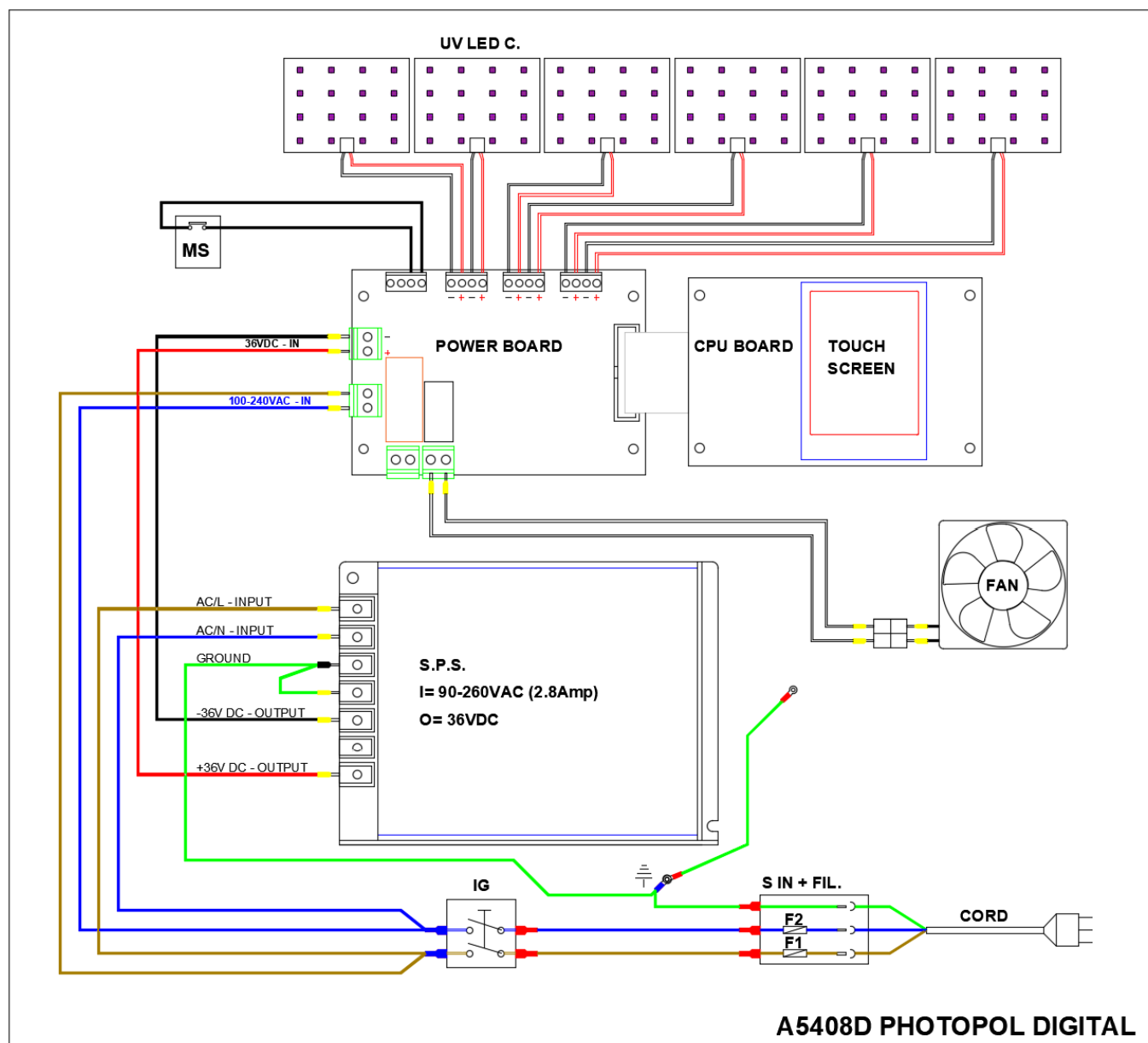
Cleaning of the working chamber

It is advisable to keep always clean the internal surfaces of the working chamber to allow the correct refraction of the emitted rays; be careful to use exclusively non-aggressive liquid detergent specific for glass and PMMA (absolutely with neither abrasive components nor alcohol).

Cleaning and replacement of the internal shelves

In case the internal shelves shall be removed or replaced pay attention not to hit the connector of the LED circuit on the wall. Seize the shelf with your both hands and slightly bend it to allow to overcome the obstacle. Use exclusively genuine spare-parts which permit the correct UV Rays to pass through.

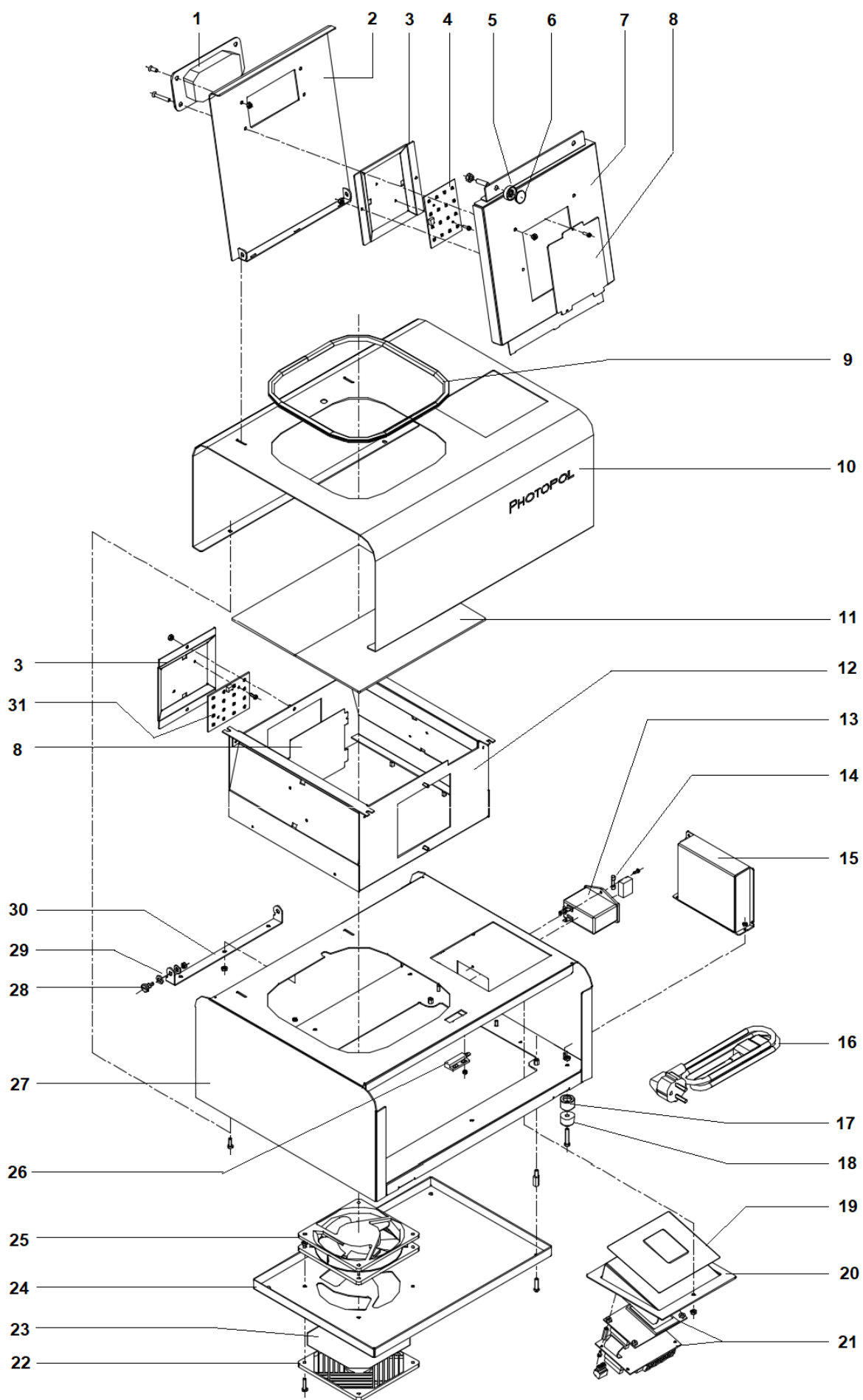
11. WIRING DIAGRAM



Symbol	Description
CORD	Separate electric cord (single-phase with protective conductor)
S-IN + FIL.	Plug, mains filter and fuse-holder
F1/F2	5x20 3.15Amp. delayed fuse
IG	Main switch
S.P.S.	100-260VAC – 36VDC switching power supply
POWER / CPU BOARD	Power board + display board
UV LED C.	16 LED Circuits
MS	Lid microswitch
FAN	Cooling fan

12. EXPLODED VIEW AND SPARE-PARTS LIST PHOTOPOL DIGITAL (A5408D)

POS.	CODE	DESCRIZIONE	DESCRIPTION
1	NVT193	MANIGLIA SPORTELLLO	LID HANDLE
2	5408054B	SPORTELLLO SUPERIORE	UPPER LID
3	5408056	SUPPORTO CIRCUITO LED	LED CIRCUIT SUPPORT
4	5408200	CIRCUITO 16 LED UV (VIOLETTO)	16 UV LEDs CIRCUIT (VIOLET)
5	5408031	ISOLANTE PER MAGNETE	MAGNET GUIDE
6	NEC043	UNITA' MAGNETICA CILINDRICA	MAGNETIC UNIT
7	5408054A	SPORTELLLO INFERIORE	LOWER LID
8	5408063	RIPARO SU SUPPORTO CIRCUITO LED	PANEL ON LED CIRCUIT SUPPORT
9	NVG034	PROFILO A “U” IN GOMMA	“U” RUBBER PROFILE
10	5408052	COPERCHIO ESTERNO ALLUMINIO SATINATO	SATIN FINISHED ALUMINUM COVER
11	5408057	RIPIANO INTERNO CAMERA	CHAMBER INSIDE SHELF
12	5408051	CAMERA DI IRRAGGIAMENTO	RADIATION CHAMBER
13	NEC131I	GRUPPO SPINA, FILTRO, PORTAFUS. & INTER.	SET OF PLUG, FILTER, FUSE HOLDER & SWITCH
14	NEA070	FUSIBILE D.=5x20 – 3.15 A	FUSE D.=5x20 – 3.15 A
15	NES100	ALIMENTATORE SWITCHING GENERALE	MAIN SWITCHING POWER SUPPLY
16	NEV013	CAVO ELETTRICO 3x1 SPINA/PRESA	ELECTRIC CABLE 3x1 PLUG/SOCKET
17	5408066	DISTANZIALE PER PIEDINO	FOOT SUPPORT
18	NVG048	PIEDINO GOMMA H=12	RUBBER FOOT
19	5408059	ETICHETTA QUADRO COMANDI	CONTROL PANEL LABEL
20	5408035	SUPPORTO COMANDI	CONTROL SUPPORT
21	5408108	SCHEDA CONTROLLO DISPLAY TOUCH	CONTROL BOARD WITH TOUCH DISPLAY
22	NVT256	PROTEZIONE IN PLASTICA SU VENTOLA	PLASTIC PROTECTION ON FAN
23	NVT255	FILTRO METALLICO SU VENTOLA	METALLIC FILTER ON FAN
24	5408055	CHIUSURA INFERIORE	LOWER CLOSURE
25	NES047	VENTOLA DI RAFFREDDAMENTO	COOLING FAN
26	NEC044	SENSORE MAGNETICO PIATTO	FLAT MAGNETIC SENSOR
27	5408050	CORPO	METAL BODY
28	5408060	VITE ASSEMBLAGGIO SPORTELLLO	LID ASSEMBLY SCREW
29	NVT081	RONDELLA NYLON D.=6mm	D=6mm NYLON WASHER
30	5408053	CERNIERA SPORTELLLO	LID HINGE
31	5408201	CIRCUITO 16 LED NEAR UV (BLUE)	16 NEAR UV LEDs CIRCUIT (BLUE)



13. CE DECLARATION OF CONFORMITY



DICHIARAZIONE DI CONFORMITA' DECLARATION OF CONFORMITY

Noi sottoscritti,
We, the undersigned,

DENTALFARM S.r.l.

Via Susa, 9/A
10138 TORINO - I
tel. (+39) 011 4346588

dichiariamo sotto la nostra esclusiva responsabilità che il prodotto di ns. fabbricazione
declare under our own responsibility that the product of our exclusive manufacturing

Codice
Code

Tipo
Type

Modello
Model

Matricola
Serial Number

Lotto
Batch

A5408D

**Fotopolimerizzatore
Light-curing unit**

PHOTOPOL DIGITAL

è conforme alle seguenti Direttive e Norme Tecniche:
complies with the following Directives and Technical Standards:

2006/42/CEE - DIRETTIVA MACCHINE - *MACHINERY DIRECTIVE*
2014/35/UE - DIRETTIVA BASSA TENSIONE - *LOW VOLTAGE DIRECTIVE*
2014/30/EU - DIRETTIVA COMPATIBILITÀ ELETTROMAGNETICA - *EMC DIRECTIVE*
2011/65/EU - DIRETTIVA RoHS II - *RoHS II DIRECTIVE*
2012/19/EU - DIRETTIVA SUI RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE (RAEE)
DIRECTIVE ON WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)
- EN 12100:2010
- EN 60204-1:2006 + A1:2009
- EN 60601-1 :2006
- EN 60601-1-2:2015

La persona incaricata di costituire il Fascicolo Tecnico è **Massimo Bertotti**
The person in charge of creating the technical file is Massimo Bertotti

Torino - *Turin,*

Amm. Delegato - *Managing Director*
Laura CATELLA

Dentalfarm s.r.l. - Via Susa, 9/a - 10138 - Torino (Italy)- Tel. (+39) 011 4346588/632 - Fax (+39) 011 4346366
E-mail info@dentalfarm.it - www.dentalfarm.it - Dentalfarm Informa 011 4346348

DENTALFARM s.r.l.

Via Susa, 9/a - 10138 TORINO - ITALY

 TECHNICAL-COMMERCIAL SERVICE (+39) 011/4346588

 AFTER-SALE SERVICE 011/4346632

 FAX 011/ 4346366

E-mail: info@dentalfarm.it

Website: www.dentalfarm.it