POLILIGHT® PL400

INSTRUCTION MANUAL

Rofin Australia Pty. Ltd.

11/2001
Version 1

POLILIGHT® PL400

Forensic Light Source

INSTRUCTION MANUAL

This manual is not to be reproduced in whole or in part without the written permission, of ROFIN AUSTRALIA PTY. LTD. The information contained in this manual is believed to be accurate, however no liability in respect of any use of it is accepted by Rofin Australia Pty. Ltd., nor is any licence implied for the use of any patented feature.

WARNING: The Polilight® PL400 has a voltage selection switch on the back panel. Ensure it is set correctly, before turning on the power.

WARNING: Opening the Polilight® PL400 and tampering with the unit (other than changing the lamp) invalidates the warranty. Qualified service personnel should only carry out Service of this unit.

WARNING: The Polilight® PL400 is an optical instrument and the light guide is liquid filled. The unit should not be subjected to freezing conditions. Freezing may damage the liquid light guide. Freezing may cause damage to the internal filters.

WARNING: The light emitted from the Polilight® PL400 and from the end of the light guide is very intense and direct viewing could be damaging to the eyes. Eye protection is advised at all times.

WARNING: Very quick turning on and off of the Polilight® PL400 can cause internal electrical damage to the unit. It is best to wait for some 15-30 seconds between turning the unit On after it has been turned Off.

CAUTION: It is essential that cooling air is able to enter the Polilight® PL400. Ensure that airflow around the unit is not obstructed**.**

W A R R A N T Y: Twelve months from date of delivery. The Polilight® PL400 is covered for replacement of defective parts and includes labor and material costs.

Rofin Australia Pty. Ltd. reserves the right to change the specification of Polilight® PL400 without notice.

C O N T E N T S

Part I: Safety Standards

_____

P O L I L I G H T ® P L 4 0 0

_____

1.1 Introduction

The Polilight® PL400 is a high intensity light source, which if used inappropriately has the potential to be a hazard to the eyes and skin. Users should use the Polilight® PL400 with the awareness that both their own eyes and skin, and those in close proximity should be protected at all times.

1.2 High Voltage Danger

The Polilight® PL400 generates high voltages internally during lamp start up. Therefore under no circumstances should unqualified staff attempt any servicing or repair. When working outdoors the unit should be protected from the dust, rain and any water in general.

1.3 Skin Protection

Care must be taken to avoid exposure to direct beam from the Polilight® PL400. To minimise the chances of unnecessary exposures it is advisable to wear appropriate protective clothing such as gloves and long sleeve shirts when operating the PL400. The total skin exposure to direct beam should not exceed 12 minutes per day and 4 minutes of continuous exposure.

1.4 Eye Protection

Goggles to use for eye protection				
Filter	Clear	Yellow	Orange	Red
White			✓	
UV 350	✓	✓	✓	✓
415		✓	✓	
430			✓	
450			✓	
470			✓	
480			✓	
490			✓	
LP530	✓		✓	
LP560	✓		✓	✓
505			✓	✓
515				✓
530				✓
550				✓
560				✓
570				✓
590				✓
620				✓
650				✓

Under no circumstances should the eyes be exposed to the direct beam produced by the Polilight® PL400. Since the light bands produced are of high intensity there is a potential for permanent damage to the unprotected eye.

In all cases excessive brightness and prolonged exposure is harmful to the eyes and should be avoided. Exposure can be from the direct beam of the PL400 and from reflected beams off highly polished surfaces such as glass or polished metal. With suitable training, advice and provision of suitable eye wear, safe operation can be ensured.

The chart above indicates the goggles to be worn to protect the eyes of the operator and people working within the minimum safe working distance of 15 meters. Even with protective goggles maximum exposure times need to be considered.

Note: 1. The orange goggles provide adequate attenuation for all filtered light but not for direct beam white light exposures for daily periods exceeding about 20 minutes.

2. The red goggles provide adequate attenuation for 350, 505, 515, 530 and 555nm filtered light, However the red goggles give as little as 30 seconds protection for white or blue light (415. 430, 450, 470, 490nm) for direct beam exposure.

3. With white light, the minimum safe working distance of 15m gives total permissible exposure times of 7 minutes for direct beam exposure.

1.5   Safe Working Distance for Unprotected People

Both at the scene of crime and in the laboratory all people within a 15 meters radius of the Polilight® PL400 should have appropriate eye and skin protection to avoid exposure from passing glimpses and from highly reflective surfaces. The operation of Polilight® PL400 should be restricted at all times to persons who have been properly trained for safe usage.

1.6   Working in the open

When using the Polilight® PL400 in the open, on a laboratory bench or at the scene of crime, it is the operator's duty to:

1.   Ensure that all people within 15 meters are wearing protective goggles for the appropriate type for the light band being used together with gloves and long sleeve shirts.

2.   Ensure that all people in the vicinity and outside of 15 meters are aware that the light source is in use.

3.   Take control of the light output beam so that no other person can view the beam directly by accident.

Part II: Operator Instructions

_____

P O L I L I G H T ® P L 4 0 0

_____
_____

2.1 Introduction

The Polilight® PL400 forensic light source is sold in a number of configurations and hence a number of different output optical bands. It is designed to be compact and portable for use at the scene of crime and in the laboratory.

The high-energy light produced by the PL400 can be hazardous to the eyes and the skin if not used correctly. The safety procedures outlined in Part I of this manual should be followed at all times.

2.2 Unpacking and Checking

2.2.1 Standard Components

The following components are standard with the PL400 and should be included in your system:

Standard accessories

POL.0006   Polilight PL400 Forensic System
POL.0007   Polilight PL400 Forensic Plus System
           Includes the following standard components;

           1x PL400 Forensic Unit (for POL.0006)
           1x PL400 Forensic Plus Unit (for POL.0007)
           1x Light guide UV-Visible 2 meters
           1x Lens focusing
           1x PL400 Hand held remote control
           1x Orange goggles
           1x Red goggles
           1x Clear goggles
           1x Yellow goggles
           1x PL400 Forensic Users Manual & Warranty Form
           1x PL400 Allen keys
           1x PL400 Carry Case

2.2.2 Common Optional Components

Optional accessories

900.0046	1x PL400 Software computer control.
900.0045	1x Bogan Clamp light guide.

Camera accessories

900.0005	1x Camera filter, high pass, mounted KV 550
900.0040	1x Camera filter, high pass, mounted GG475
900.0041	1x Camera filter, high pass, mounted GG515
900.0042	1x Camera filter, high pass, mounted GG590
700.0008	1x Camera adapter (short)
700.0034	1x Camera stepping rings 52/58
700.0035	1x Camera stepping ring 49/58
900.0007	1x Band Pass mounted Filter 565-40nm
900.0009	1x Band Pass mounted Filter 415-40nm
900.0008	1x Band Pass mounted Filter 590-40nm
900.0006	1x Band Pass mounted Filter 610-40nm
700.0007	1x Adapter for camera (tilt) (for band pass filters)

2.3 Operation

2.3.1 Power Cable and Power Supply

The PL400 has a power selection switch on the rear of the unit. You should ensure that the power is selected to suit your environment. The settings are 115VAC 50Hz and 230VAC 60Hz. You must ensure that the correct setting is made BEFORE you turn on the power to the unit.

2.3.2 Light Guides and Focusing Optics

Light from the internal 400-Watt Metal Halide lamp of the Polilight® PL400 is directed and focused by a flexible liquid light guide. The standard light guide is designed specifically to transmit large amounts of radiation in the Ultra-Violet and Visible regions.
.

Fig 1. The black focusing optics lens fits into the end of the liquid light guide.

The output end of the light guide is designed for a snug fitting focusing optics piece, called the focusing lens. The focusing lens can slide in and out of the light guide. This enables the optical beam to be sharply focusing to a spot. In practice the end of the light guide is held in the palm and the focusing optics piece is adjusted with the thumb and forefinger. Figure 1 shows the focusing optics.

The handle end of the light guide is designed to be inserted into the PL400 light guide aperture. The correct fitting of the light guide is as follows;

Step 1.   Unscrew, but do not remove the light guide gland (black or grey fitting)

Step 2.   Insert the handle of the light guide so that <u>none of the handle is showing</u>. **Up to the blue strip**
        Note: this may require you to giggle the handle inside the aperture.

Step 3. Screw the light guide gland so that it is tight and hold the light guide handle firmly.

2.3.3   Power up Sequence

Place the Polilight® PL400 on a solid surface and turn the power switch (back panel) to the up (ON) position. It is essential that cooling air be allowed to enter the PL400 so ensure that the air intakes are not restricted. Air intakes on the PL400 are at the lower section of the front panel.

After initial power up the PL400 microprocessor conducts an initialisation process that ensures that the filter wheel is in the correct position, before the lamp is turned on. This procedure takes approximately 10 seconds. During this process you will see " tst" displayed on the front panel (If the lamp does not come on after some minutes turn the power off, wait some minutes try again.) The PL400 is designed not to turn on if during the initialisation an error was detected. If an internal error is detected "err" will be displayed in the display window. Should the unit not turn on after several attempts contact your supplier.

The default setting from power up is 450nm filter (470 is some units).

2.3.4   Filter Selection

The two buttons on the front control panel control the internal filter wheel. Simply press and release the left or right hand button to turn the filter wheel one way or the other. Holding down the buttons performs other tasks (see shuttering and standby).

Front control panel of the PL400 showing LED display and two control buttons

The PL400 has a number of selectable output light bands. The type of bands depends upon the PL400 model you have purchased and are detailed below.

Polilight PL400 Forensic (Scene of crime) Output Bands:

350 (UV), 415,450, LP530, 490,505,530, White, Low White, Blank

Polilight PL400 Forensic Plus (Scene of crime and Laboratory) Output Bands

350 (UV), 415, 430, 450, LP530, 470, 480, 490, 505, 515, 530, 550, 560, LP560, 570, 590, 620, 650, White, Low White, Blank.

	Band Colour		Band Width	Display	Applications
1	White	White	280nm	000	General searching
2	Low White	White	280nm	=0=	General searching
3	Blank	No light	-	===	Safety
4	350*	UV	80nm	350	General searching
5	415	Violet	40nm	415	Blood prints, splatter
6	430	Blue	40nm	430	General searching (semen, urea, fibres)
7	450	Blue	100nm	450	General searching (semen, urea, fibres)
8	470	Blue	40nm	470	General searching (semen, urea, fibres)
9	480	Blue	40nm	480	General searching (semen, urea, fibres)
10	490	Blue	40nm	490	General searching (semen, urea, fibres)
11	LP530	Blue	< 530nm LP1		Broad searching
12	LP560		< 560nm LP2		General for all treatments
13	505	Blue/Green	40nm	505	Ninhydrin & super-glue treatments
14	515	Green	40nm	515	Ninhydrin & super-glue treatments
15	530	Green	40nm	530	DFO & super-glue treatments
16	550	Green/Orange	40nm	550	DFO & super-glue treatments
17	560	Orange	40nm	560	DFO & super-glue treatments
18	570	Orange	40nm	570	Ninhydrin prints, background reduction
19	590	Orange/Red	40nm	590	Ninhydrin prints, background reduction
20	620	Red	40nm	620	Ninhydrin prints, background reduction
21	650	Red	40nm	650	Ninhydrin prints, background reduction

* Note: A standard PL400 system includes a blank position either side of UV.

2.3.5 Filter Display

The central wavelength of the bandwidth chosen is shown numerically, in nanometres, on an electronic 3- segment display on the front of Polilight® PL400. The display will update when the filter selection is completed.

2.3.6   Blanking the Output (ie light shutter)

At any time you can "shutter" the light output by pressing the left-hand button in and holding it for some 1 second. This will cause a shutter to cut out all the light. You can revert to the original filter setting by again holding the left-hand button down for 1 second.

2.3.7   Stand-by Mode

At any time you can go to stand-by mode (ie lamp off but fans on) by holding down the right hand button on the front panel for 3 seconds. You can restart the lamp by holding down the same button.

Note: We suggest that you do not restart the lamp for some period (20-30 seconds) after a shut down.

2.3.8   Automatic Stand-by Mode

The PL400 has an automatic stand-by procedure built into it. This is designed to prevent the light from being left on if un-attended, which could be potentially dangerous with unprotected and unauthorised users coming into the working area.

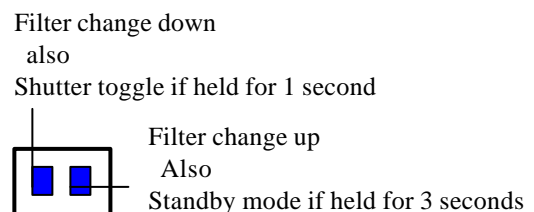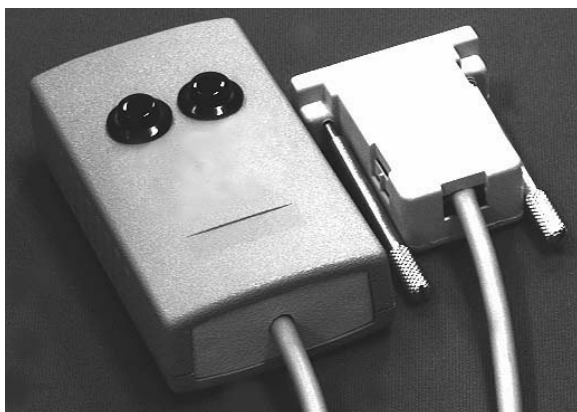The automatic stand-by works in the following manor;

1. If no user input to the PL400 is detected (ie front panel or remote control) within the time period t1 period then the unit will automatically go into the shutter position. The default time t1 =30 minutes

2. Again if left un-touched then after a second period t2, the lamp will turn off whilst the fans will keep running. (To restart the lamp hold down the right hand button for 3 seconds and the lamp will restrike.) The default time t2=15 minutes

Otherwise turn the PL400 OFF and ON again from the power switch located on the back panel.

Note: the user can alter t1 and t2 if the remote control software option is purchased.

2.3.9   Remote Control

The PL400 has the ability to be controlled from a hand held remote control box. See figure below. The remote control is on a two-meter cable.

Filter change down
 also
Shutter toggle if held for 1 second

Filter change up
 Also
Standby mode if held for 3 seconds

Note: The buttons have two actions and can be pushed and immediately released or pushed and held for some seconds before release.

PL400 Hand held remote control.

This PL400 remote has two buttons that can control all of the PL400 functions. The remote plugs into the rear panel of the PL400 using a 15 pin D type connector. The button functions are described above.

3.0 Appendix 1 (error messages)

After initial power up the PL400 microprocessor conducts an initialisation process that ensures that the filter wheel is in the correct position, before the lamp is turned on. This procedure takes approximately 10 seconds. During this process you will see " tst" displayed on the front panel. The PL400 is designed not to turn on if during the initialisation an error was detected. If an internal error is detected "err" will be displayed in the display window followed by an error code.

Some errors are self-correcting however some are not and will require service.

The following is a list of errors that can possibly occur.

Error Code	Description
E=1	Can not get data from E^2PROM. Fatal error needs service.
E=2	Front Keyboard is stuck. Fatal error needs service.
E=3	Motor table error. Should self correct.
E=4	Motor calibration error. Needs service.
E=5	Motor zero error. Needs service.