CytoLED Operating Manual

Device Specifications, Operating Instructions & Basic Usage Information

Generation 3 Manual - Version 1.1

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Welcome to the Operating Manual

INTRODUCTION

Thanks for choosing CytoLED! We've created this digital manual as a companion to your device to ensure you understand all that your light is capable of so that you can get the most out of it, no matter how experienced you are with red light therapy. We chose to go digital with the Operating Manual so that it can be updated over time, you'll always have the latest version at hand, and it avoids any waste.

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RED LIGHT THERAPY

An introduction to red light therapy and how it pertains to your CytoLED device.

WAVELENGTHS

A basic overview of the wavelengths used in red light therapy and why we choose 660nm and 850nm for our devices.

DEVICE COMPARISON TABLE

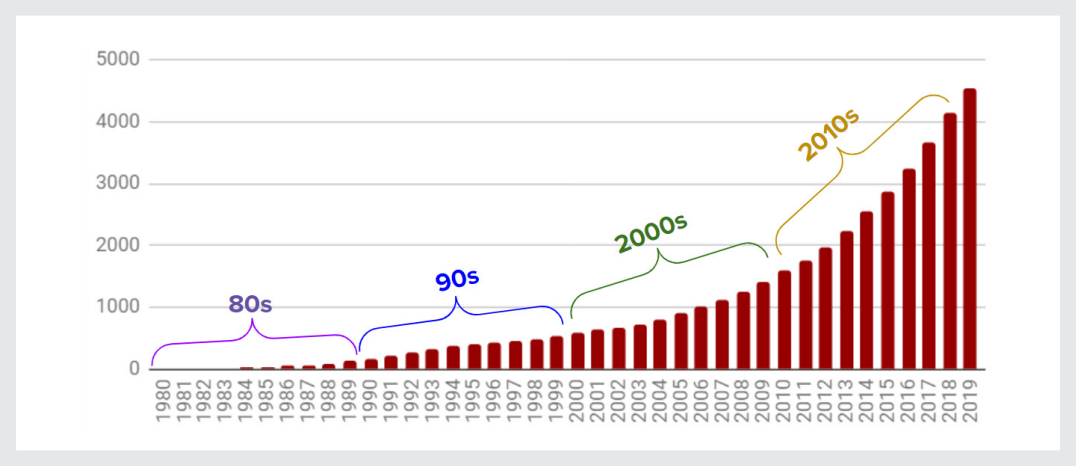
A table to display the specifications of each CytoLED device and show how they compare to each other.

Section 01
Red Light Therapy & Specifications

RED LIGHT THERAPY

Red light therapy harnesses the power of red and near-infrared light to influence cellular function. Most available research on it has been published in the last 15 years, but it has a longer history of use, in some ways as old as time. Humans throughout the ages have praised the sun as a life-giving force, and contrary to popular belief, many of the beneficial effects of sunlight go beyond vitamin D synthesis, and involve the red and near-infrared part of the light spectrum.

NUMBER OF RED LIGHT THERAPY RESEARCH PUBLICATIONS [1980-2019]



In 1904 physicians John Harvey Kellogg and Margaret Abigail Cleaves published their books on incadescent light therapy for treatment of chronic fatigue, diabetes and hair loss. Many of the therapeutic effects of incandescent light at high doses stem from the red and near-infrared portion of the light, though some also trace back to the effect of the blue portion on the circadian rhythm.

Modern red light therapy started in the 60s, when it was found that red lasers can promote hair growth in mice. Initially publications were slow to appear. Starting around the 90s, the pace of red light therapy research has been steadily increasing, and is still increasing rapidly today.

Section 01
Red Light Therapy & Specifications

WAVELENGTHS

660NM & 850NM

Each CytoLED panel emits both 660nm and 850nm wavelengths, two of the most researched wavelengths. 660nm is visible to the human eye, and looks red. 850nm is not visible, but many cameras can pick it up and show it as a purple-ish hue. Of the two, 850nm penetrates deeper. Our lights contain 660nm/850nm in a 1.3/1 ratio, measured by irradiance.

PICK YOUR WAVELENGTH

Many of our devices (all except the Zero) allow you to select Red only, NIR only, or to have both. This is explained in more detail in the Control Panel section.

RED

Red light is most suited for treating more superficial tissues, such as the skin, as it penetrates less deeply.

660 nanometers

NEAR-INFRARED

Near-infrared light is suited for treating deeper tissues, such as muscles, as it penetrates more deeply.

850 nanometers

Section 01
Red Light Therapy & Specifications

DEVICE COMPARISON TABLE

Device	Zero	One	One Plus	Duplex	Triplex	Pentaplex
LEDs	35	70	70	140	210	350
Wattage	43W	106W	101W	200W	310W	506W
Beam Angle	60°	30°	30°	30°	30°	60°
660NM	No	Yes	Yes	Yes	Yes	Yes
850NM	No	Yes	Yes	Yes	Yes	Yes
660NM+850NM	Yes	Yes	Yes	Yes	Yes	Yes
Timer	No	Yes	Yes	Yes	Yes	Yes
Dimmer	No	No	Yes	No	No	No
Weight	1.8KG	4.0KG	4.1KG	5.8KG	8.2KG	13KG
Dimensions (cm)	24x23x6.5	33.5x22x6.5	33.5x22x6.5	65.5x22x6.5	97x22x6.5	151x22x6.5

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Usage, Operating & Safety Guidelines

Usage, Operating & Safety Guidelines

SECTION 02

CONTROL PANEL

USAGE GUIDELINES

SAFETY GUIDELINES

CONTROL PANEL

An explanation of the functions that the control panel provides, including the wavelength selector and timer.

USAGE GUIDELINES

Some guidelines on how to use your CytoLED device, including distance and timing recommendations, to maximize efficacy.

SAFETY GUIDELINES

Some discussion on safety precautions and the biphasic dose response curve.

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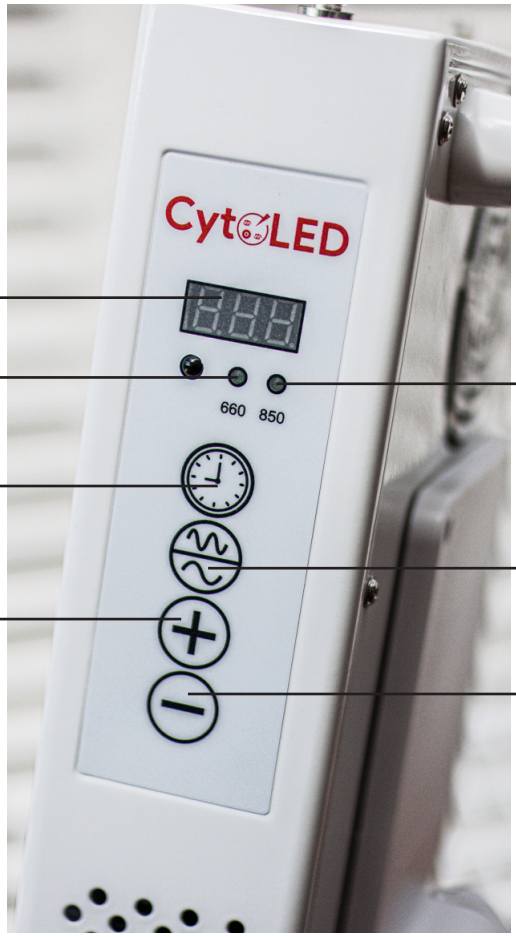
CONTROL PANEL



[1] Timer Screen

[2] Near-Infrared Indicator

[3] Red Indicator

[4] Timer Button

[5] Wavelength Selector Button

[6] Timer Plus Button

[7] Timer Minus Button

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CONTROL PANEL

[1] TIMER SCREEN

This screen displays information relevant to the timer. It lets you know which timer setting you have selected and how many minutes you have left (if you have the timer active). There are three digits, the first displays the timer setting, and the second and third display the amount of minutes left.

By default the device turns on with the timer mode on, set to 10 minutes.

-If the first digit displays a "t", this means the timer is turned on, and the minutes will start counting down.

-If the first digit displays an "n", this means the timer is turned off and the device will stay on indefinitely, until the power switch is flipped.

[2] NEAR-INFRARED INDICATOR

This indicator shows that your device has the near-infrared/850nm LEDs active.

[3] RED INDICATOR

This indicator shows that your device has the red/660nm LEDs active.

[4] TIMER BUTTON

This button switches the timer on and off. The timer can be set to a maximum of 30 minutes.

-When the timer is enabled, a "t" appears in front of the digits.

-When it's disabled, an "n" appears in front of the digits.

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[5] WAVELENGTH SELECTOR BUTTON

This button allows you to select whether your device emits red only, near-infrared only, or both.

By default your device is set to both when first turned on.

-Pressing the wavelength selector button once turns both wavelengths off.

-Pressing again sets your device to near-infrared/850nm only.

-Pressing again sets your device to red/660nm only.

-Pressing again sets your device back to the start with both wavelengths on.

[6] TIMER PLUS BUTTON

This button increases the duration of the timer (if active) by 1 minute per press. Rather than pressing the button over and over you can simply hold it down, if you prefer that.

[7] TIMER MINUS BUTTON

This button decreases the duration of the timer (if active) by 1 minute per press. Rather than pressing the button over and over you can simply hold it down, if you prefer that.

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USAGE GUIDELINES

RECOMMENDED DISTANCE:

50-60 cm, at this distance the red and near-infrared beams have sufficiently converged and the light is fairly evenly distributed.

MAXIMUM DISTANCE:

The One, One Plus, Duplex, Triplex and Pentaplex models can be used from up to 2 meters distance, however, they would need to be used for 4x as long.
The Zero model can be used from up to 1 meter distance, but it has to be used 2.5x as long as the Zero at 50cm.

RECOMMENDED EXPOSURE TIME:

For promoting systemic health, we recommend using your device for 5-20 minutes at the 50-60cm distance (longer for the Zero, see the table below). Please keep in mind that as you increase the distance the recommended exposure time also increases. See the table below for multipliers to reference when using your device at a distance.

Device	50-60cm	80cm	1 meter	1.5 meters	2 meters
Zero	10-40 mins	1.5x	2.5x	N/A	N/A
One	5-20 mins	1.25x	1.5x	2.5x	4x
One Plus	5-20 mins	1.25x	1.5x	2.5x	4x
Duplex	5-20 mins	1.25x	1.5x	2.5x	4x
Triplex	5-20 mins	1.25x	1.5x	2.5x	4x
Pentaplex	5-20 mins	1.25x	1.5x	2.5x	4x

RECOMMENDED USAGE FREQUENCY:

For systemic effects, we recommend daily use. Some users have even found that 2 or 3 sessions a day gives them the best results. These sessions should be spaced apart by at least an hour if they are 20 minutes or longer. For specific indications, we recommend consulting the research found in the PBM database by Vladimir Heiskanen, and mimicking what the researchers use for a particular indication in studies that found benefit. The database can be found at: http://bitly.com/PBM-database

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RECOMMENDED EXPOSURE AREAS FOR SYSTEMIC BENEFITS:

For systemic benefit, it's best to expose a large surface area. We recommend using the stomach and chest or back. There may also be some utility to exposing different parts of the body sequentially, but limited research generally seems to indicate longer exposure in one area is better.

RESEARCH-BACKED TARGETED USE:

When using your device for targeted application/specific indications, we recommend consulting the research directly. For a comprehensive overview of the available research see: http://www.bitly.com/PBM-database

Under the "E" column in the database you can see the irradiance, reported as W/cm², which should be multiplied by 1000 to get the irradiance in mW/cm², the way we report our irradiance numbers. Under the "H" column you can find the energy administered per square cm, expressed in J/cm². This is the number you want to mimic to administer a similar dose of energy for a local indication. W=J/second.

Example case:
A study reports an irradiance of 0.01 W/cm², and energy per square cm of 10J/cm²
The irradiance used here is 0.01x1000= 10mW/cm².
If you use our One device at 50-60cm, the irradiance is about 32mW/cm². This means whatever duration they used in the study, you do 3.2x less.
In the study they reached 10J/cm², with an irradiance of 0.01 W/cm², this took 10/0.01= 1000 seconds ≈ 16.7 minutes
To get your duration of use, divide this by 3.2, and you get approximately 5 minutes.

SELF-EXPERIMENTATION:

Even though we have laid out some recommended times for systemic use, and given you the tools for using your device to mimic the doses used in red light therapy research, we still highly encourage self-experimentation.

As Michael Hamblin said when we communicated with him: "Different individuals have differing degrees of susceptibility to light, and what is too much for one person may be nowhere enough for another person.". When using the light for specific, targeted indications and mimicking research doses, it's often harder to perceive an acute effect, and it may be best to just stick to the research doses. However, when using it for systemic health/general wellness, the subjective sense of "satiety" is probably a good indicator. It may take some time to develop this sense, but many have reported they can eventually feel when they've had an optimal amount of light. In many ways the feeling is analogous to having just had a satiating meal, one feels "full" with light. Any more, and the feelings of well-being decrease, any less, and they haven't been maximized yet.

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SAFETY GUIDELINES

BIPHASIC DOSE RESPONSE

Red light therapy has been shown to have a biphasic dose response curve. This means that too little light produces a suboptimal effect, and too much does as well. However, for the most part, higher doses don't appear harmful, just less effective. It's worth noting that different tissues lie at different depths, so it may be the case that to get the optimal dose to one tissue, another tissue needs to get an excess. Also, for systemic effects, it's less known what the dose response curve looks like.

TESTICLES

There are a few promising animal studies showing increases in testosterone concentration from irradiating the testes. However, in some of those studies, histological damage to the testes was observed, particularly with near-infrared. Unfortunately, these studies report their dosage parameters poorly (making basic mistakes in their calculations for instance) and it is very hard for us to ascertain whether they simply used highly excessive doses and overheated the testicles. Our suspicion is that this is indeed the case, and that moderate use on the testes is fine. Some people have anecdotally reported beneficial effects from this to us. However, considering the small amount of evidence hinting at potential safety concerns, we recommend caution when irradiating this area. We understand it may be tempting, but we do not assume any responsibility for the potential negative outcomes of engaging in this practice.

EYES

We recommend not having the device shine on the face with eyes open for more than a minute. For normal use, the eyelids should provide adequate protection. A few seconds of shining the light right into the eyes should be of little concern, blue wavelengths show significantly more potential for harm.

HANDLING AND POSITIONING OF DEVICES

As with any electrical and/or heavy device, a reasonable amount of caution should be used when moving, positioning and using your CytoLED device. We recommend avoiding placing the device on highly flammable surfaces. Please make sure that most ventilation holes are not blocked. When you lay a device such as the Duplex, Triplex or Pentaplex down on its side, the ventilation holes on one side will be blocked. The ventilation holes on the other side and the back adequately make up for that in this case. However, when the ventilation holes on the back are also blocked, fully or partially, there is a risk of the device overheating, please avoid this.

ANY QUESTIONS LEFT?

We hope the CytoLED Operating Manual has been informative but if anything remains unclear, please feel free to email us: info@cytoled.com