

IMT Power Light **protected**

Application Note

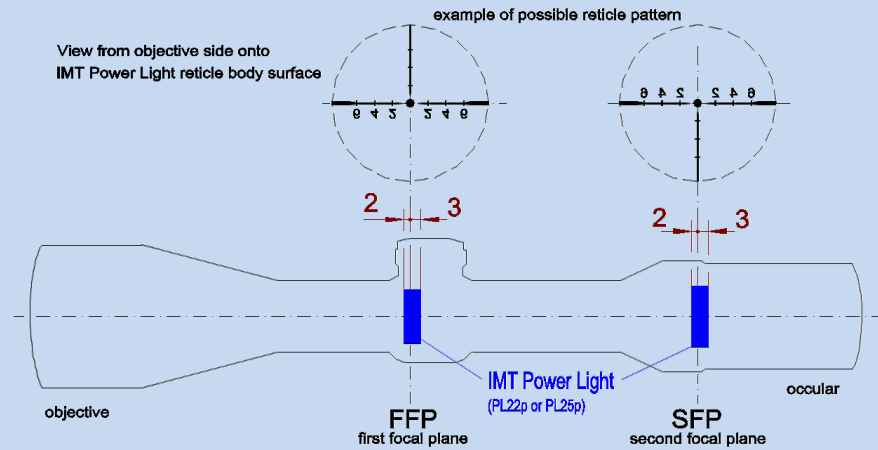


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PL22p / PL25p

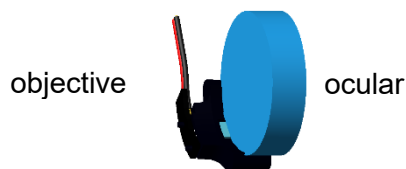
Scope reticle

Integration overview



Mechanical / optical Integration

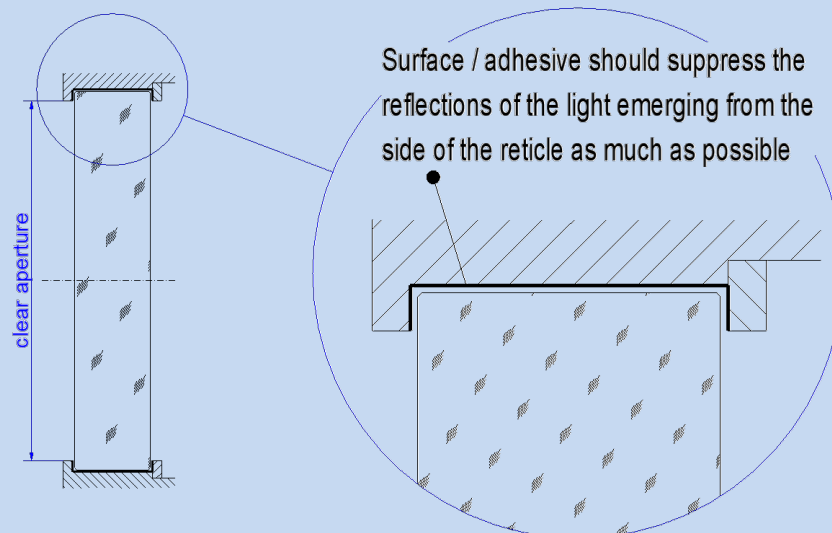
- Place and adjust IMT Power Light reticle center and pattern plane to optical axis and focal plane.
- Angular adjust crosshair (if any) to horizontal resp. vertical orientation.
- As an option the IMT Power Light is available with an additional flattening on the circumference of the glass body to have an angular reference on the round reticle.
- Secure IMT Power Light glass body in tube against displacement under mechanical shock. Do not apply mechanical stress to any of the other parts of the IMT Power Light (such as holder, prism, PCB and cable).
- The prism surface of the IMT Power Light must not be covered. Front and rear (clear aperture) of reticle glass body and as well the prism must be operated in air/gas with refractive index ≈ 1 .
- Drawing showing orientation of the IMT Power Light referenced to objective and ocular.



Position of the light engine around the circumference of the glass body can vary depending on the individual pattern design. (Drawing just shows an example)

Light suppression

- The aim is to prevent the light that leaves the reticle through the surface at the circumference from re-entering the glass body. It greatly minimizes illuminated artefacts and light haze.



Electrical Operation

Electrical operation / illumination performance

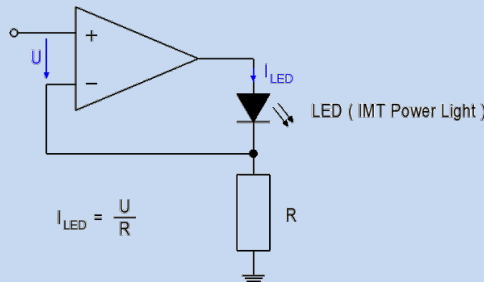
- The IMT Power Light is known as the daylight bright, illuminated reticle assembly.
- To maximize the level of illumination IMT only uses a selection of just the brightest LEDs.
- The brightness of the LED primarily depends on the current through the LED.
That's why it is recommended to operate the IMT Power Light with current control to have the ability to control the illumination level of the LED directly on its main dependency.

Electrical connection

- Electrically connect the strands of the IMT Power Light to an appropriate power supply.
- Make sure anode and cathode go to the right connection points on the power supply.
Standard: anode = red strand / cathode = black strand (can vary on customer specific solutions).
- Secure the connections against disconnecting under mechanical shock.

Dimming by current variation (constant current supply)

recommended

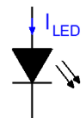


Example circuit of adjustable constant current supply – many other circuit approaches possible.

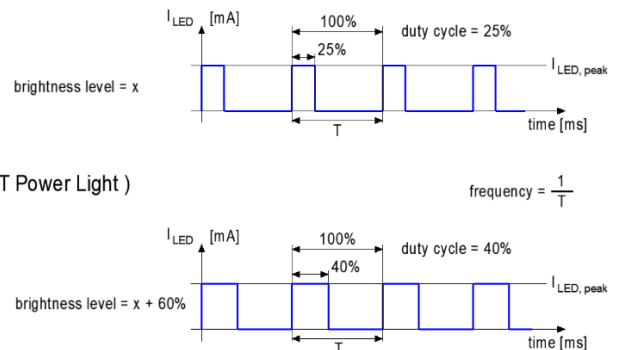
- Advantage: - brightness selection of LED is actively used because of current control
- Disadvantage: - circuit more complex
- Recommendation: - valid for inspection of IMT Power Light
- valid to compare brightness of different LEDs (same current to be set)
- valid to measure brightness of LED (against current)

Dimming by PWM (pulse with modulation)

highly recommended



LED (IMT Power Light)

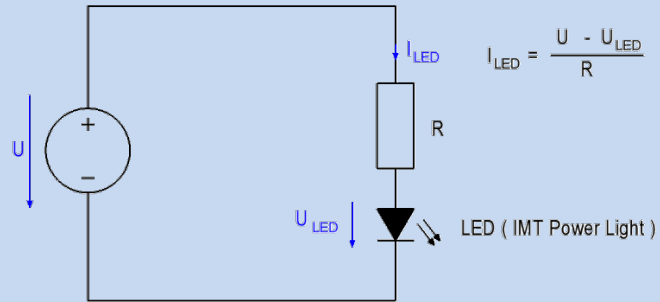


State of the art LED operation principle: pulse width modulation.

- Advantages: - brightness selection of LED is actively used because of current control
- linear brightness dependency on pulse width (duty cycle)
- always same operating point (when operated at fixed peak current)
- power efficient (when operated at 20 mA LED nominal peak current)
- no color shift (when operated at fixed peak current)
- Disadvantage: - circuit more complex
- Recommendation: - for use in scope
- valid for inspection of IMT Power Light
- valid to compare brightness of different LEDs (with same PWM settings)
- valid to measure brightness of LED (against current and pulse with setting)
- use 20 mA as fixed peak current (20 mA = LED nominal peak current)
- use frequency of about 800 Hz to 1 kHz

Dimming with current limiting resistor (switching resistor R)

possible



Wide variation of U_{LED} to expect for different LEDs, hence the current cannot be controlled exactly to the same value with same resistor R (for different LEDs).

- Advantage: - simple circuit
- Disadvantages: - brightness selection of LED is ignored because current is not controlled accurate
 - different operating points of LED when switching dimming resistor R
 - power inefficient operating of LED
 - LED color shift can occur on different LED operating points
- Recommendation: - do not use to measure or compare brightness
 - do not use for incoming inspection (because LED brightness cannot be controlled)
 - valid for simple testing (light / no light)

References

IMT Power Light Datasheet	IMT Power Light Datasheet for PL22p, PL25p	12.9.-.D.EN.240116
IMT Power Light Drawings	Assembly Drawing IMT Power Light PL22p	D 850842
	Assembly Drawing IMT Power Light PL25p	D 850845
ams-Osram LED Datasheet	Mini TOPLED® LS M67F	
ams-Osram Application notes	Comparison of simple LED circuits for low power LEDs	No. AN040
	Dimming InGaN LEDs	No. AN042
	Reliability and lifetime of LEDs	No. AN006
	Details on photobiological safety of LED light sources	No. AN002