



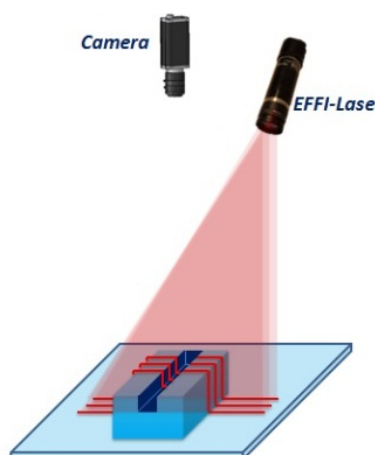
LED Pattern projector

EFFI-Lase

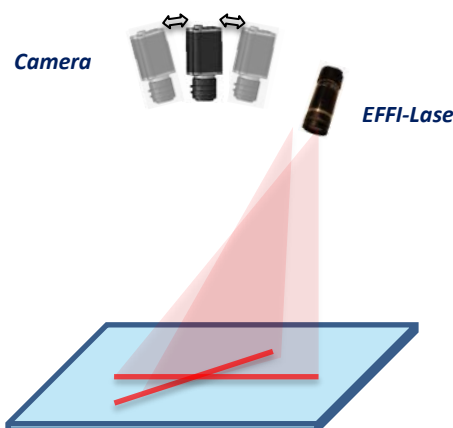
- **Sharp edges** for accurate measurements
- **Homogeneity**
- **Standard** connections and fasteners
- No speckle
- **Flexible:**
 - Any C-mount objective
 - **Large range of patterns**
 - Full range of colors: **from UV to IR, white**
- **Long lifetime** and few maintenance



APPLICATIONS:



Stereo Vision and 3D profiling



Alignment applications

OVERVIEW OF THE CHARACTERISTICS

Electronics	<i>Power supply</i>	24V DC or constant current
	<i>Illumination mode</i>	Continuous or strobe modes
	<i>Connectors</i>	M12 4 pins or M8 3 pins
	<i>Power consumption</i>	5W
Optics	<i>Wavelength</i>	Various wavelengths (from UV to IR, white)
	<i>Projection system</i>	Any C-mount objective
Mechanics	<i>Projected pattern</i>	Various designs for alignment, 3D profiling and stereovision
	<i>Maximum dimensions</i>	32mm x 105mm (without the objective)
	<i>Objective adjustment</i>	A C-mount adaptor on the projector
	<i>Fastener</i>	4 M4 holes on the side of the device
Environment	<i>Material</i>	Device body : Aluminum alloy
	<i>Working temperature</i>	0°C to 50°C
	<i>IP code</i>	IP54

TECHNICAL CHARACTERISTICS

How to create the EFFI-Lase?

EFFI-Lase_CM_XXX_XXX

Pattern

Wavelength (nm)

Available wavelengths:

- White: **000**
- Far UV: **365**
- Near UV: **405**
- Blue: **465**
- Green: **525**
- Red: **625**
- Far Infrared: **850**

Other wavelengths are available upon request

Available options:

- Add a 'P' to integrate a polarizer
- Add a 'S' to strobe the device

Example: EFFI-Lase_CM_L03_625_P_S

3D profiling

L01	Single line pattern 50µm
L02	Single line pattern 20µm
L03	Single line pattern 10µm
L04	3 lines pattern 500µm pitch
L05	3 lines pattern 200µm pitch
L06	5 lines pattern
L07	100 lines pattern
L08	20 lines pattern
L09	Single line pattern 5µm

Stereovision

C02	Cloud of dots - density 50%
C03	Cloud of dots 1 - density 17%
C04	Cloud of dots 2 - density 17%
G01	Grid with rounded points - small
G02	Grid with rounded points - large
G03	Grid with lines - small
G04	Grid with lines - large
G05	Grid with squares

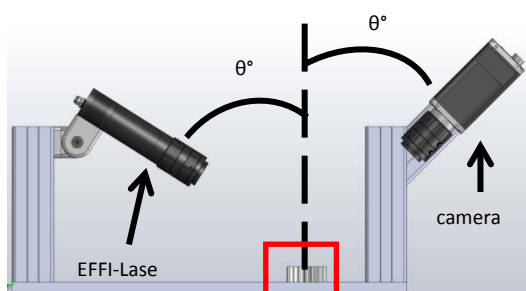
Alignment

A01	Cross pattern
A02	Concentric circles
A03	4 lines arranged in a square

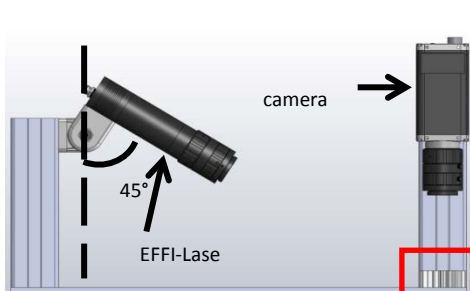
Specific patterns are available upon request

Pattern projection description

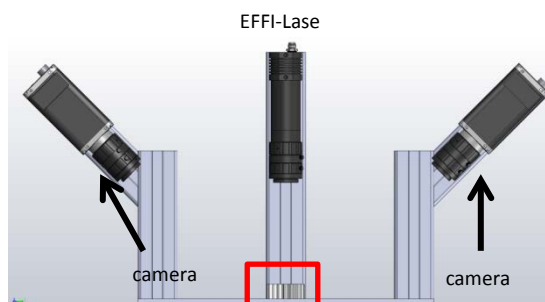
Three examples of recommended configurations:



Configuration 1



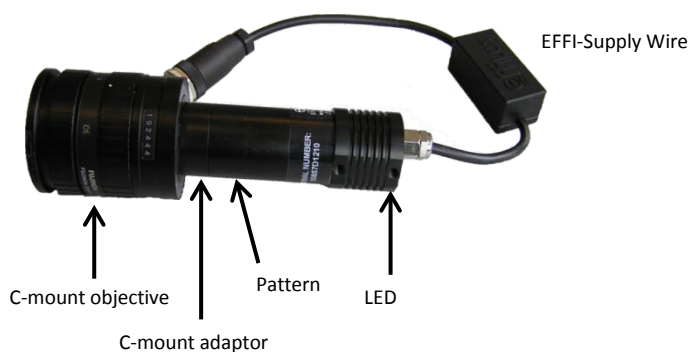
Configuration 2



Configuration 3

The selection between configuration 1 and configuration 2 depends on the object to observe: either the specular reflection needs to be captured (configuration 1) or reflections different from the specular reflections (configuration 2) are considered.

Pattern projector description

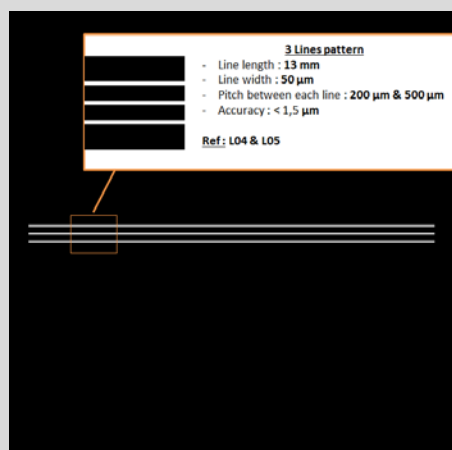
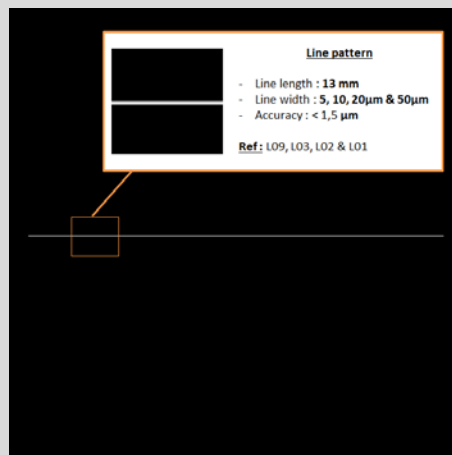


Any C-mount objective can be mounted on the EFFI-Lase.

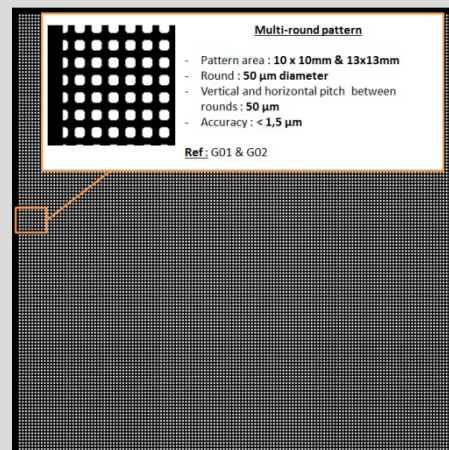
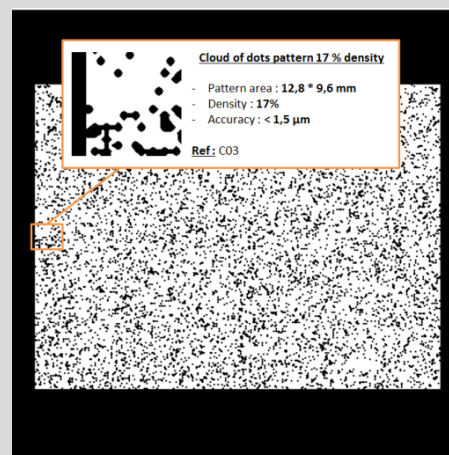
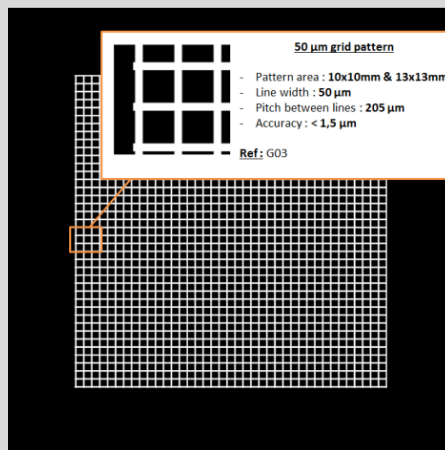
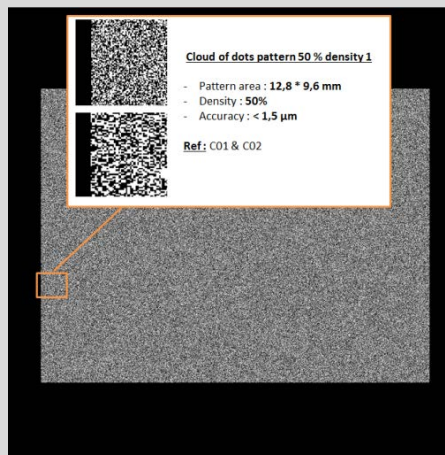
To guarantee the quality of the projector, the pattern is directly mounted in the projector body. However, the pattern can be observed through the aperture of the projector. Avoid any contact with the mask: this one is sensitive and can easily be damaged.

Masks presentation

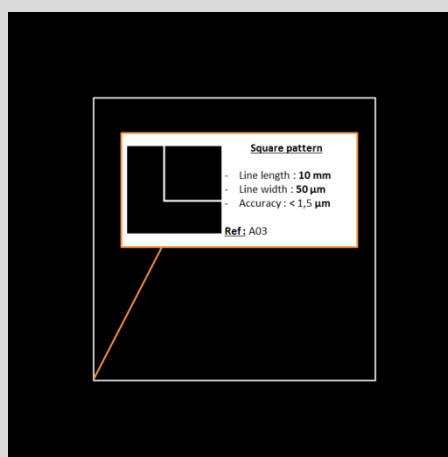
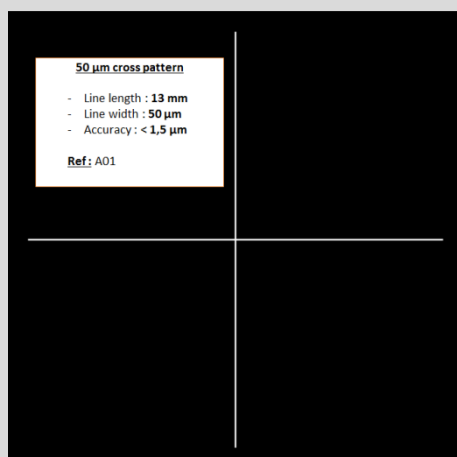
3D Profiling



Stereovision application

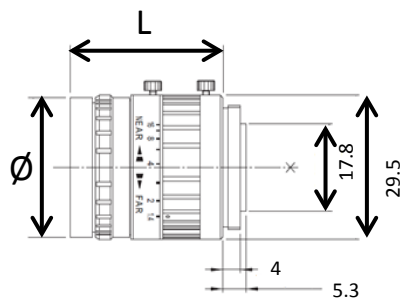


Alignment



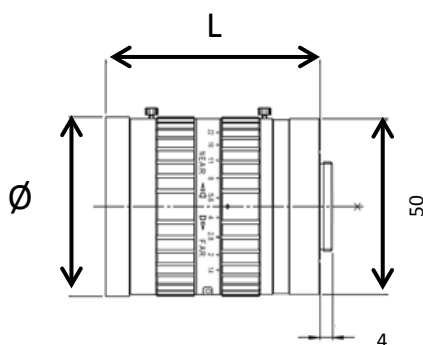
Objective selection

EFFILUX recommends using one the following objectives with the EFFI-Lase.



	EFFO-Objective_0001 HF9HA-1B	EFFO-Objective_0002 HF12.5HA-1B	EFFO-Objective_0003 HF25HA-1B	EFFO-Objective_0004 HF50HA-1B
Focal Length (mm)	9	12.5	25	50
Iris Range	F1.4 – F16			F2.3 – F22
Angle of view (HxV)	52°06' x 40°16'	38°47' x 29°35'	19°58' x 15°02'	10°03' x 7°33'
Filter thread	M27x0.5	M25.5x0.5	M25.5x0.5	M25.5x0.5
L x Ø (mm)	35 x 28.5 mm	29.5 x 26.5 mm	29.5x26.5 mm	29.5x26.5 mm

A high resolution objective is recommended for large patterns, such as the cloud of dots.



	EFFO-Objective_0007 HF12.5SA-1	EFFO-Objective_0008 HF25SA-1	EFFO-Objective_0009 HF50SA-1	EFFO-Objective_0010 HF75SA-1
Focal Length (mm)	12.5	25	50	75
Iris Range	F1.4 – F22		F1.8 – F22	
Angle of view (HxV)	38°47' x 29°35'	19°58' x 15°02'	10°03' x 7°33'	6°43' x 5°02'
Filter thread	M49x0.75	M49x0.75	M49x0.75	M49x0.75
L x Ø (mm)	68.5 x 51 mm	75.5 x 51 mm	55.5x51 mm	76x51 mm

Depending on the working distance (WD) and the C-mount objective selected, different pattern sizes are obtained:

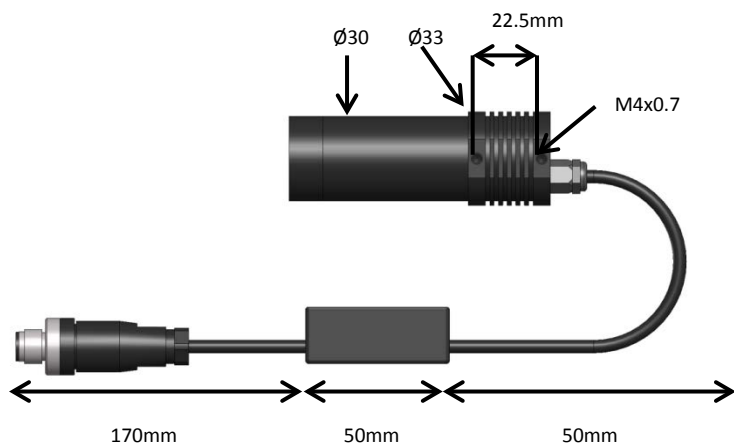
Objective	Line length (mm)				
	WD = 20mm	WD = 50mm	WD = 100mm	WD = 200mm	WD = 300mm
f=9mm	55	100	170	300	450
f=12.5mm	50	75	130	230	340
f=25mm	15	40	60	120	180
f=50mm	n.a.	n.a.	15	45	75

Dimensions of a 50µm line pattern

Objective	Pattern dimensions H x W (mm)		
	WD = 200mm	WD = 500mm	WD = 1000mm
f=25mm	100 x 76	250 x 188	500 x 380
f=50mm	-	125 x 94	250 x 190

Dimensions of a 12.8x9.6mm cloud of dots pattern

Mechanical considerations



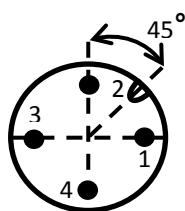
Four M4x0.7 holes can be used to fasten the device in the set up.

Electrical characteristics

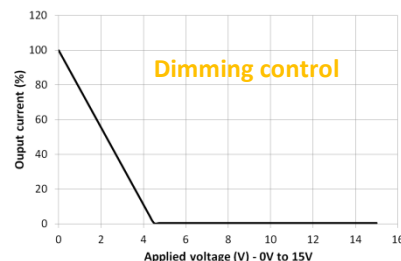
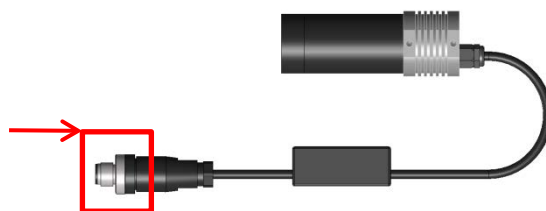
Standard connection

The EFFI-Lase is supplied using the EFFI-Supply Wire (bolted on the projector) and a 24V constant voltage.

Pin number	Cable color	Designation
1	Brown	+24V
2	White	n.a.
3	Blue	GND
4	Black	DIM – max 15V



M12 connector



Make sure that you never exceed the maximum voltage.

The device is supplied with a 24V (±5%) constant voltage source.

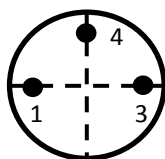
Connection with a current source

A current source, with the correct settings and the correct wires, can be used to supply EFFI-Lase in a pulsed mode: contact EFFILUX technical support for complete details.

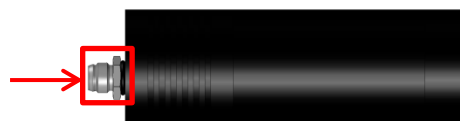


Be aware that the current source option cannot be used with the EFFI-Supply Wire but needs a specific M8 connector.

Pin number	Cable color	Designation
1	Brown	n.a.
3	Blue	+
4	Black	GND

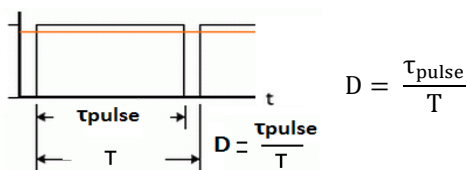


M8 connector



The projector, supplied with a 700mA constant current is considered as the reference. The frequency of the cycle (ON & OFF) has been fixed to 10Hz.

The maximal duty cycle, D, dependent on the injected current, required to safely pulse the LED projector is defined by:



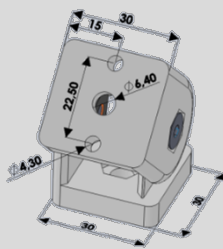
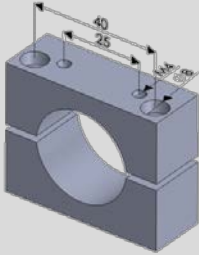
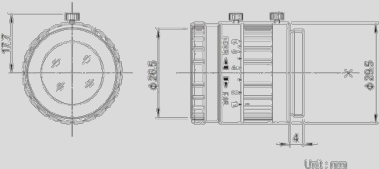
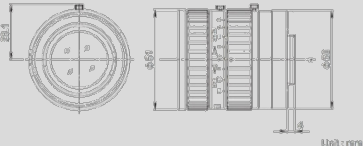
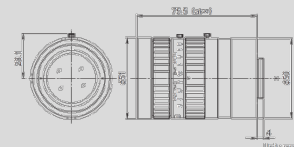
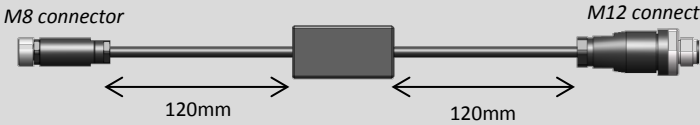
Be aware that the maximum duty cycle for a given current, given in the following table, cannot be exceeded.

Configuration	Current	Max pulse duration (μs)	D
1	1.2A	50000	0.5
2	1.5A	10000	0.1
3	2A	1000	0.01
4	2.5A	100	0.001
5	3.5A	40	0.0004

$$G_{\text{max}} = \frac{\text{luminous flux } (I_{\text{max}})}{\text{luminous flux } (I_{700\text{mA}})}$$

G _{max}	400nm	460nm	525nm	590nm	625nm	850nm	White
Configuration 1	1,5	1,4	1,4	1,5	1,6	1,5	1,4
Configuration 2	2	1,8	1,7	2,1	2	1,8	1,7
Configuration 3	2,6	2,2	2,1	2,7	2,6	2,4	2
Configuration 4	3,2	2,6	2,3	3,4	3,2	2,9	2,4
Configuration 5	4	3,1	2,9	4	4,4	3,6	2,8

ACCESSORIES

	EFFILUX reference	Description	
Mechanics	EFFM_1_0009		Fastener used to simplify the projector integration (orientation) <i>Delivered with 2 M4x12 screws, 1 M6x14 screws and 1 EFFV-Bolt_0011</i>
	EFFM_1_0001		Fastener used to simplify the projector integration <i>Delivered with 2 M4x20 screws</i>
Optics	EFFO-Polariser_0004	Polarizer integrated in the projector to polarize the output light	
	EFFO-Objective_0001		HF9HA-1B – f=9mm, 2/3"
	EFFO-Objective_0002		HF12.5HA-1B – f=12.5mm, 2/3"
	EFFO-Objective_0003		HF25HA-1B – f=25mm, 2/3"
	EFFO-Objective_0004		HF50HA-1B – f=50mm, 2/3"
	EFFO-Objective_0005		HF75HA-1B – f=75mm, 2/3"
	EFFO-Objective_0006		<i>High resolution objective</i> HF9SA-1 – f=9mm, 2/3"
	EFFO-Objective_0007		HF12.5SA-1 – f=12.5mm, 2/3"
	EFFO-Objective_0008		HF25SA-1 – f=25mm, 2/3"
	EFFO-Objective_0009		HF50SA-1 – f=50mm, 2/3"
	EFFO-Objective_0010		HF75SA-1 – f=75mm, 2/3"
	EFFO-Objective_0011		CF12.5HA-1 – f=12.5mm, 1"
	EFFO-Objective_0012		CF16HA-1 – f=16mm, 1"
	EFFO-Objective_0013		CF25HA-1 – f=25mm, 1"
	EFFO-Objective_0014		CF50HA-1 – f=50mm, 1"
Electronics	EFFC-Cable_M12_0002 Binder: 79 3430 13 04	M12 cable, 4 pins, 2000mm long	
	EFFC-Cable_M12_0003 Binder: 79 3430 17 04	M12 cable, 4 pins, 5000mm long	
	EFFC-Cable_M12_0004 Binder: 79 3430 30 04	M12 cable, 4 pins, 10000mm long	
	EFFC-Cable_M12_0025 Phoenix : 1456938	M12 cable, 4 pins, High-Flex, 1500mm long	
	EFFC-Cable_M12_0025 Phoenix : 1456941	M12 cable, 4 pins, High-Flex, 3000mm long	
	EFFE-Comp_0006	 LED driver to use in the strobe configuration	

