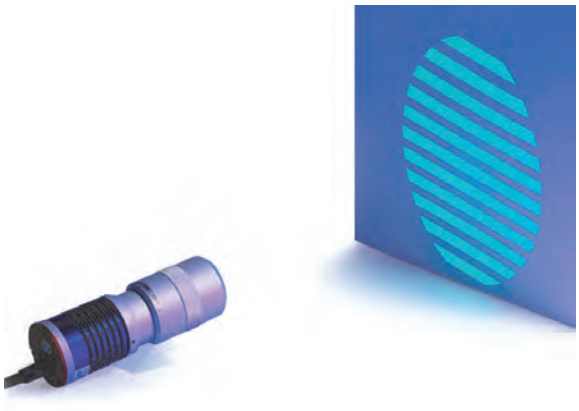
LED pattern projectors

LTPR Series are the most advanced and efficient devices for Pattern Projection and Structured Light applications, such as 3D reconstruction.
Unlike Laser Sources, which typically show poor line sharpness and power distribution inhomogeneity as well as scattering and diffraction effects, LT PR overcome all of these problems by integrating LED sources and precisely engraved masks.
Any kind of pattern shape can be easily supplied, integrated and projected by these devices. Different colors, including UV and IR, are available and the size of the projection area can be easily modified by interchanging the projection optics.

UV — and versions available — IR



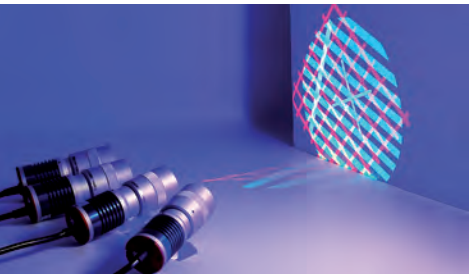
KEY ADVANTAGES

Perfectly sharp edges

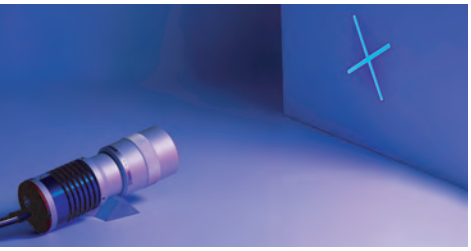
LT PR SERIES ensures thinner lines, sharper edges and more homogeneous illumination than lasers.

With **laser** emitters the illumination decays both across the line cross section and along the line width.

Laser emitters lines are thicker and show blurred edges; diffraction and speckle effects are also present.



LTPR Series projectors are available in different colors.

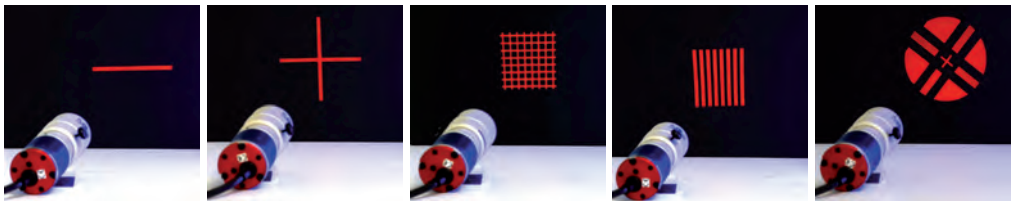


LTPR36/UV405 projecting a cross at 405 nm.

Any color is available

part number	light color, wavelength peak
1W type VIS PATTERN PROJECTORS	
LTPR36/R	red, 630 nm
LTPR36/G	green, 520 nm
LTPR36/B	blue, 460 nm
LTPR36/W	white
3W type VIS PATTERN PROJECTORS	
LTPR3W/R	red, 630 nm
LTPR3W/G	green, 520 nm
LTPR3W/B	blue, 460 nm
LTPR3W/W	white
IR PATTERN PROJECTORS	
LTPR36/IR890	IR, 890 nm
LTPR36/IR940	IR, 940 nm
UV PATTERN PROJECTORS	
LTPR36/UV365	UV, 365 nm
LTPR36/UV385	UV, 385 nm
LTPR36/UV405	UV, 405 nm

Any shape can be projected

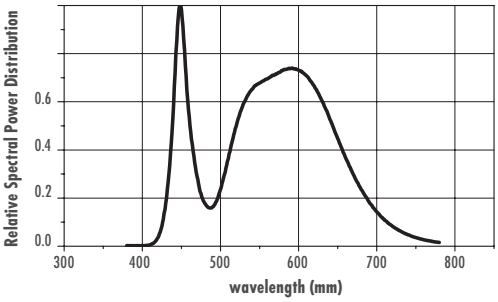


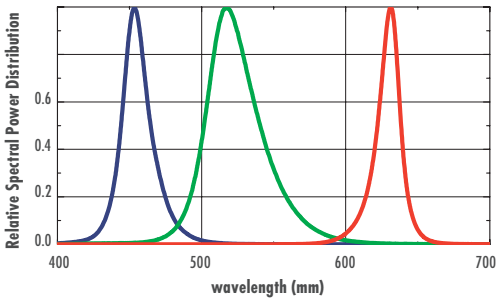
line | crosshair | grid | stripes | whatever

Application Example

profile measurement | 3D recostruction | visualization &mapping | mechanical alignment

LED Typical Spectrum





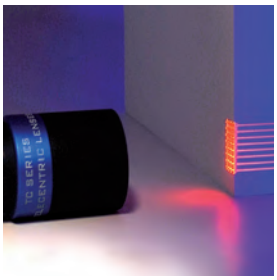
/UVxxx and /IRxxx versions:

peak emission wavelength: xxx nm

optical bandpass:
+/- 20 nm FWHM

class:
IIIb LED product

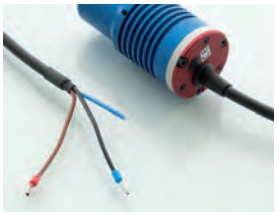
Most optics are suitable for projection



LTPR projectors can integrate specific projection optics (OEPL Series) as well most kinds of C-mount 2/3" machine vision lenses by means of the C-mount adaptor included in the package. The device can also be interfaced to microscopy systems and to telecentric lenses to as to provide telecentric pattern projection.

Devices can be driven with flexibility

These LED devices integrate built-in switching electronics which control the current flow through the LED and which can be easily tuned by the user. This ensures both high light stability and a longer lifetime of the product.

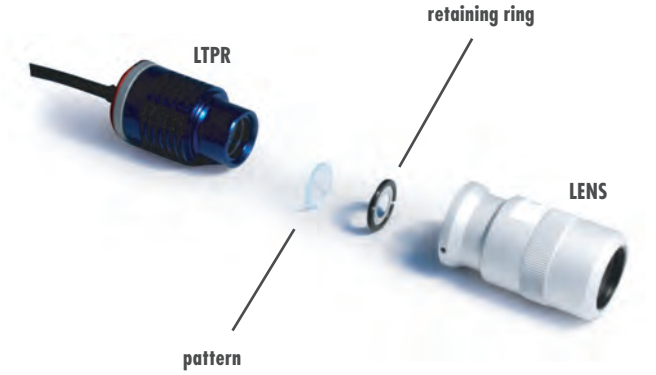


The inner circuitry can be bypassed in order to directly drive the LED. Simply connect the black and blue wires to your power supply instead of the black and brown ones, ensuring that the maximum rates are not exceeded.

		device power rating			led power rating		
part number	light color, wavelength peak	minimum DC voltage (volt)	maximum DC voltage (volt)	power consumption (watt)	forward voltage (volt)	forward current (mA)	pulse ratings @0,1 duty/1kHz (mA)
1W type VIS PATTERN PROJECTORS							
LTPR36/R	red, 630 nm	12	24	< 2	2,3	350	< 1800
LTPR36/G	green, 520 nm	12	24	< 2	3,5	350	< 1800
LTPR36/B	blue, 460 nm	12	24	< 2	3,5	350	< 1800
LTPR36/W	white	12	24	< 2	3,5	300	< 1800
3W type VIS PATTERN PROJECTORS:							
LTPR3W/R	red, 630 nm	12	24	< 3	2,6	700	< 1800
LTPR3W/G	green, 520 nm	12	24	< 3	3,8	700	< 1800
LTPR3W/B	blue, 460 nm	12	24	< 3	3,8	700	< 1800
LTPR3W/W	white	12	24	< 3	3,8	700	< 1800
IR PATTERN PROJECTORS							
LTPR36/IR890	IR, 890 nm	12	24	< 2	1,6	500	n.a.
LTPR36/IR940	IR, 940 nm	12	24	< 2	1,6	500	n.a.
UV PATTERN PROJECTORS							
LTPR36/UV365	UV, 365 nm	12	24	< 2	3,7	350	n.a.
LTPR36/UV385	UV, 385 nm	12	24	< 2	3,7	350	n.a.
LTPR36/UV405	UV, 405 nm	12	24	< 2	3,7	350	n.a.

Pattern selection

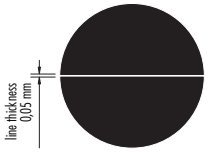
The projection pattern can be easily integrated into the LTPR projection unit by unscrewing the retaining ring that holds the pattern itself. This simple procedure makes it easy to interchange different patterns on the same projection unit.
The pattern outer diameter is 21 mm, while the active projection area is a circle of 11 mm: all the significant features of the pattern are drawn inside such a circle. The projection area will show the same aspect ratio as the pattern. The projection accuracy depends both on the pattern manufacturing accuracy and lens distortion. The projection edge sharpness depends on both the lens resolution and the engraving technique: Laser-engraved patterns (part numbers ending in "L") or Photolithography-engraved patterns (part numbers ending in "P") can be chosen depending on the type of application.



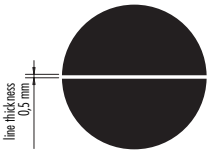
STANDARD PATTERN

photolithography patterns		laser engraved patterns	
Substrate	soda lime glass	Substrate	borofloat glass
Coating	Chrome	Coating	dichroic mirror
Geometrical accuracy	2 micron	Geometrical accuracy	50 micron
Edge Sharpness	1.4 micron	Edge Sharpness	50 micron

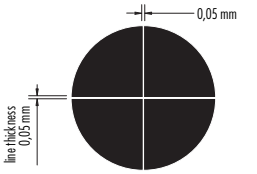
P/N: PT00000100P — line pattern



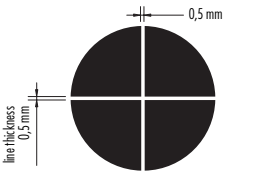
P/N: PT00000100L — line pattern



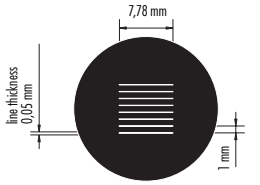
P/N: PT00000200P — cross pattern



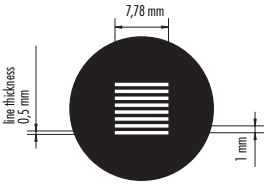
P/N: PT00000200L — cross pattern



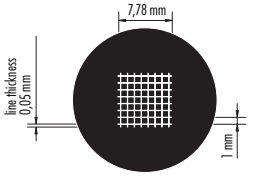
P/N: PT00000300P — stripe pattern



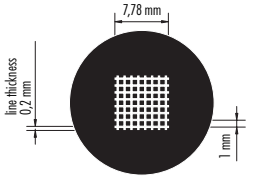
P/N: PT00000300L — stripe pattern



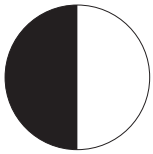
P/N: PT00000400P — grid pattern



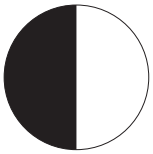
P/N: PT00000400L — grid pattern



P/N: PT00000500P — edge pattern

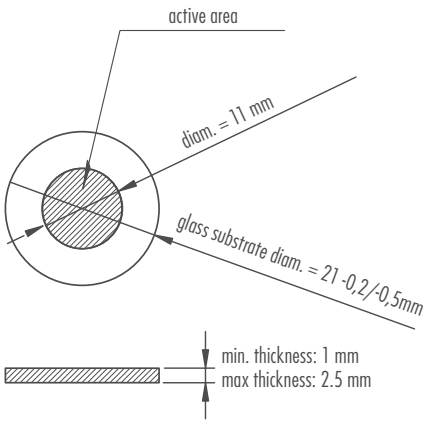


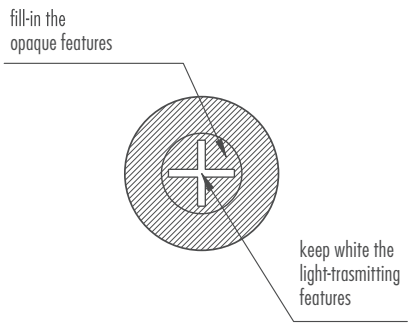
P/N: PT00000500L — edge pattern



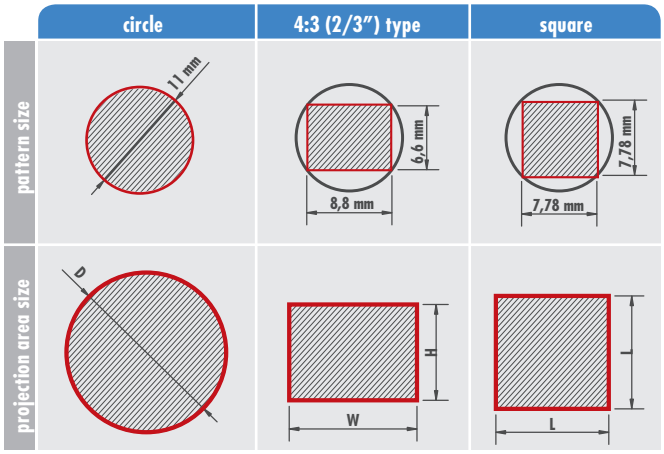
CUSTOM-MADE PATTERN

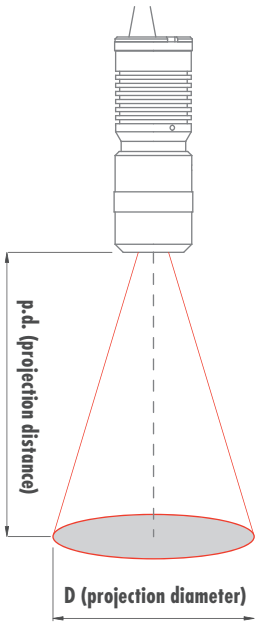
Custom-made patterns suitable for specific needs can be supplied on request.
A drawing with all the significant geometrical information must be submitted (please refer to the instructions here below).





Projection lens selection





The pattern drawing that has to be projected must be inscribed in a circle whose diameter is 11 mm, same diagonal of a 2/3" detector.

For example, the pattern drawing could cover the entire 11 mm diameter area or be like a 8.8 x 6.6 mm rectangle (same size of a 2/3" detector) or, again, be a square whose side is 7.78 mm.

Unless the projection optics introduces significant distortion, the shape of the projection respects the same features and aspect ratio of the engraved area of the pattern. The projected area dimensions will be "M" times the original dimensions of the pattern, where M is the optical magnification at which the selected projection lens is operating.

LTPR units can integrate most types of high resolution lenses. Besides our OEPL optics, specifically tailored for this projection application, any high resolution C-mount lens can be used, provided it is tailored for 2/3" detectors (11 mm image diagonal). Telecentric lenses for 2/3" detector can also be interfaced, thus providing a parallel projection of the pattern scheme and enabling unparalleled performances in 3D measurement applications. C-mount lenses and telecentric optics can be connected to the unit by means of the mount adaptor included in the product package. Here below are listed the projection diameters and the recommended projection distances achievable by means of different types of optics.

OEPL projection optics

OEPL lens	lens description	minimum projection distance (p.d.) (mm)	maximum projection distance (p.d.) (mm)
VIS PROJECTION OPTICS			
OEPL18	18° projection, full angle	300	800
OEPL25	25° projection, full angle	250	600
OEPL38	38° projection, full angle	200	500
OEPL50	50° projection, full angle	100	300
UV PROJECTION OPTICS			
PEB2528-UV	25° projection, full angle	250	500

Telecentric lenses

VIS	**TC 23 04**	**TC 23 07**	**TC 23 09**	**TC 23 16**	**TC 23 24**	**TC 23 36**
p.d. (mm)	57,1	61,2	63,3	45,3	69,2	103,5
D (mm)	5,5	8,3	11,0	20,8	31,4	45,2
	TC 23 48	**TC 23 56**	**TC 23 64**	**TC 23 72**	**TC 23 80**	**TC 23 96**
p.d. (mm)	134,6	159,3	182,3	227,7	227,7	279,6
D (mm)	59,8	70,0	80,0	89,9	99,7	117,8
UV	**TCUV2336**	**TCUV2348**	**TCUV2356**	**TCUV2364**	**TCUV2380**	
p.d. (mm)	98,7	130,7	154,0	176,0	221,0	
D (mm)	45,7	60,0	70,1	80,1	99,6	

2/3" C-mount lenses

C-mount Lens	D (mm)								
	@50 mm	**@75 mm**	**@100 mm**	**@150 mm**	**@200 mm**	**@250 mm**	**@300 mm**	**@400 mm**	**@500 mm**
6 mm	81	127	172	264					
8 mm	58 (*)	92	127	195	264	333			
12 mm	35 (*)	58 (*)	81	127	172	218	264		
16 mm		41 (*)	58 (*)	92 (*)	127	161	195	264	333
25 mm				55 (*)	77 (*)	99 (*)	121 (*)	165	209 (*)
35 mm						68 (*)	83 (*)	115	146

(*) = spacers maybe needed to compensate back focal length