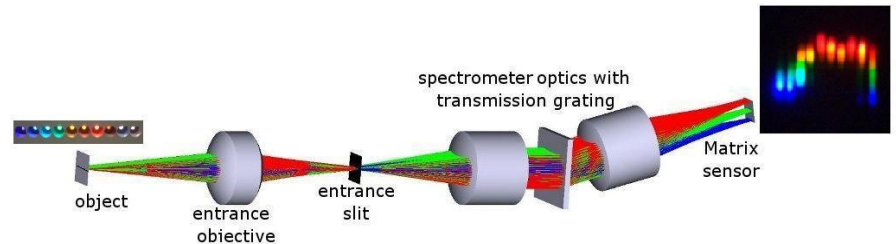


The spectral imaging spectrographs by inno-spec are developed for high performance applications in hyperspectral imaging. The VIS devices are optimised for use with

CMOS or CCD cameras. They feature a robust design and expand a Machine Vision camera to a spectral imaging system. An essential intention in the design of the spectrograph is the homogeneous distribution of light over the whole spatial area.



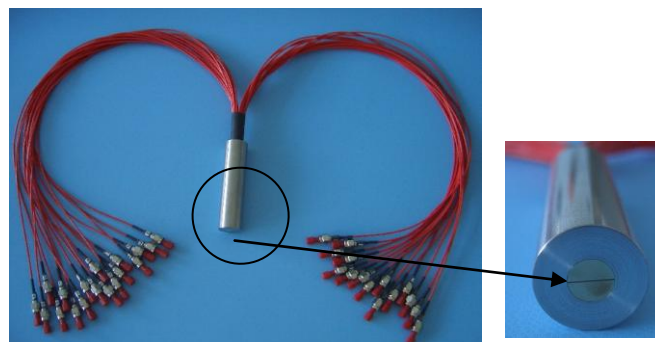
Typical VIS- Applications

- *High-precision spectral resolved color measurement (offline and inline)*
- *Biomedical Applications*
- *Inline quality control (e.g. LED production)*
- *Thickness of coating measurement (e.g. silicon production)*
- *Fluorescence measurement*
- *Ecological monitoring*

The transmission spectrograph exhibits a VPH grating (VPH =Volume Phase Holographic) which provides very high spectral efficiency and reduces the stray light ratio. The characteristics were optimised for a homogeneous light distribution over the whole sensor area, a high light throughput and minimised internal reflections. These characteristics are especially important for applications in industrial surroundings and good performance in research projects.

The spectrograph consists of the following components:

High-quality entrance slit, two mega pixel lens systems with 50 mm focal length and a holographic transmission grating.



Multi fibre adaptors consist of a certain amount of single light fibres which are arranged in a line and illuminate or replace the entrance slit.

It is possible to analyze and monitor several measurement points (each fibre means one measurement point) at the same time with the single ends of the fibres.

Technical Data:

Spectrograph	IST-VIS 0.38-0.78	IST-VIS 0.38-1.0
Optical and spectral characteristics		
Spectral range ¹	380nm – 780nm	380 – 1000nm
Dispersion ¹	66 nm/mm	99 nm/mm
Spectral resolution ²	7,2 nm FWHM (with 50 µm slit)	11 nm FWHM (with 50 µm slit)
Image size	max. 10 mm (spectral) x 14 mm (spatial)	
Spatial resolution ²	rms spot radius < 35 µm	
Bending of spectral lines across spatial axis (Smile) ³	Smile < 40 µm	Smile < 45 µm
Bending of spatial lines across spectral axis (Keystone) ³	Keystone < 15 µm	Keystone < 15 µm
Numerical Aperture	F/2.0	
Slit sizes	10µm, 30µm, 50µm, 80µm, 100µm on request	
Slit length	14 mm	
Grating efficiency	> 50%	
Stray light	< 1% (halogen lamp, 590nm long-pass filter)	
Recommended sensor size	Max 2/3"	
Mechanical characteristics		
Dimensions, OEM	(W)50 x (H) 80 x (L) 205 mm	
Spectrograph angle	10°	8°
Weight	750 g	
Housing, OEM	Anodised aluminium (black)	
Objective threat	Standard c-mount	
Operational conditions		
temperature (shipping)	-20 ... +65°C, non-condensing	
temperature (operating)	+5 ... +50°C non-condensing	

¹ Spectral range and the according dispersion can be customized to your application upon request.

² Spectral and spatial resolution also depend on the entrance objective as well as the used imaging sensor/camera.

³ A correction matrix for MATLAB can be supplied for correction upon request.

A multi fibre input @ 50 µm slit is possible, further slit sizes on request.

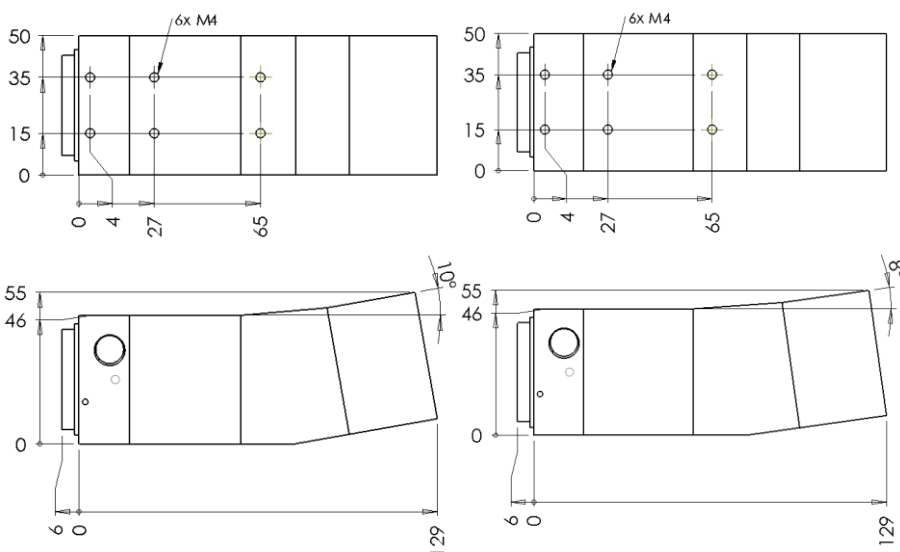
Entrance objectives:

The entrance objectives usually used are standard C-mount mega pixel objectives for machine vision applications. Optimized objectives for the used spectral range can be purchased at inno-spec on request. The focal length of the entrance objective will influence the smile and keystone effect.

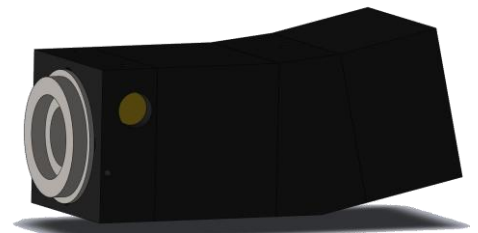
Optical entrance and/ or order sorting filters:

We recommend using the spectrographs with entrance and order sorting filters because CMOS and CCD sensors are sensitive at wavelengths from 200 nm to 1000 nm. These filters can be mounted in front of the entrance objective or as an order sorting coating placed in front of the camera. Additionally it is possible to optimize the spectral intensity characteristics by certain filters. Please ask for more detailed information.

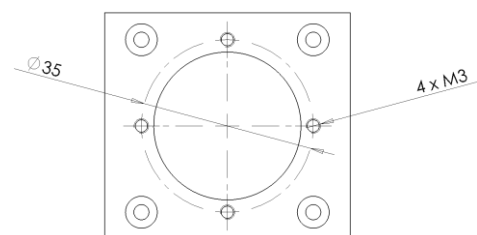
Mechanics:



Mechanical dimensions of IST-VIS 0.38 – 0.78 and IST-VIS 0.38 – 1.0



3D view of spectrograph



Mechanical drawing of camera