

Analytical Imaging Process Technology



FIBRE OPTIC HYPER SPECTRAL CAMERA



uniSPEC1.7FOM
uniSPEC1.9FOM
uniSPEC2.2FOM

LLA Instruments GmbH

Purpose

The NIR hyperspectral cameras uniSPEC1.7FOM, uniSPEC1.9FOM, uniSPEC2.2FOM (uniSPECx.xFOM) combine LLA Instruments' NIR hyperspectral imaging technology (e.g. uniSPECx.xHSI) and fibre optics instead of an objective as optical element. The fibre optic hyperspectral camera is advantageous in case small

installation heights are requested for large conveyor belt widths. The flexibility of the fibre cables enables e.g. online quality control of finished products on various conveyor belts which may even be many meters apart from each other. Generally, uniSPECx.xFOM and uniSPECx.xHSI are suitable for the same application fields (figure 1).

Setup

The uniSPECx.xFOM can be equipped with up to 64 optical fibre cables. The optical fibre cables consist of low-OH quartz material, enabling a high speed transmission of NIR radiation to the spectrometer. The high frame rates of the uniSPECx.xFOM (270 Hz for uniSPEC1.7FOM and uniSPEC2.2FOM; 795 Hz for uniSPEC1.9FOM) ensure a better performance at high conveyor belt speeds compared to the multiplexed NIR spectrometer uniSPECx.xMPL. The fiber optic hyperspectral camera

uniSPECx.xFOM is integrated into a control cabinet including optical fibre cables, splice box and an industrial PC for camera control. The industrial PC includes camera control software (figure 2) and pre-configured application software, depending on analysis (sorting) task. The control cabinet has a degree of protection level of IP54 (camera itself IP 65). The setup of uniSPECx.xFOM is completed by a probe line PMAmpl or a combination of optic line (OL) and illumination unit (LU).



figure 1: Applications fibre optic hyperspectral camera uniSPECx.xFOM

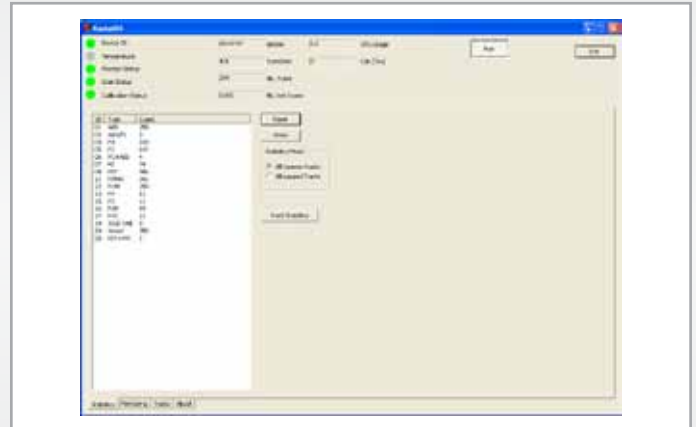


figure 2: Statistical evaluation, control software KustaMSI

| 2D spectral camera | uniSPEC1.7FOM | uniSPEC1.9FOM | uniSPEC2.2FOM |
|----------------------------------|--|---|---|
| Camera type | Push-broom imaging camera | | |
| Spectral range | 0.95 μm - 1.7 μm | 1.32 μm - 1.9 μm | 1.25 μm - 2.17 μm |
| Spectral resolution | <8 nm | | |
| Sensor | InGaAs photodiode array | | |
| Image frame (spatial x spectral) | 320 pixel x 256 pixel | 192 pixel x 96 pixel | 320 pixel x 256 pixel |
| Dispersion/pixel | 3.6 nm | 6 nm | 3.6 nm |
| Frame rate | 270 fps (410 fps in ROI mode) | Up to 795 Hz (no ROI mode available) | 270 fps (410 fps in ROI mode) |
| Power supply | 24 V DC, 2.5 A | | |
| Operating temperature range | +5 °C up to +45 °C | | |
| Operating humidity range | 20 % up to 90 % | | |
| Optical component | Up to 64 optical fibre cables (low-OH quartz material) combined in splicebox | | |
| Outer diameter of fibre (core) | 105 μm | | |
| Tracks per fibre (64 fibres) | 5 | 3 | 5 |
| Control cabinet dimensions | 600 mm x 610 mm x 515 mm (LxWxH) | | |