

## OptoLine OL 80

CCD line camera for width measurement, web guiding, position recognitions



## Purpose

Modern, automated processing plants demand new, intelligent sensors. These sensors, however, must adapt easily to a large variety of scanning tasks and integrate readily in all control and computer systems on the market. The CCD line camera OptoLine OL 8028, offers a particularly wide variety of functions for contact-free position measurement.



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Connected to any PLC, PC or Erhardt + Leimer control system, a variety of functions can be satisfied. In most cases it will not be necessary to change the position of the CCD camera; for example, a camera measuring range of 800 mm offers a resolution of 0.1 mm.

Applications so far:

- Web guiding by one edge or center line
- Web guiding by a line, groove, channel
- Web guiding by watermark, label line
- Determination of edge, center-line or line positions
- Reel positioning
- Laminating processes using up to 16 networked cameras
- Recognition of diagonal web displacements, e.g. alignment of plates
- Concentricity monitoring
- Monitoring of liquids e.g. for contamination at jet outlets
- Width measurement

## Design and function

The CCD line camera OptoLine OL 8028 incorporates the entire electronics required for scanning and evaluation as well as a control panel.

Scanning is based on CCD array with 2048 pixels. The use of a dynamic sub-pixel algorithm increases the resolution to 1:8192.

The DSP (digital signal processor) evaluates the data acquired by the CCD array. The control processor monitors the CCD chip and the integrated control panel and coordinates the CAN interface.

Coupler modules are available for other bus systems and interfaces. The scanning criteria required can be selected or changed any time via CAN interface.

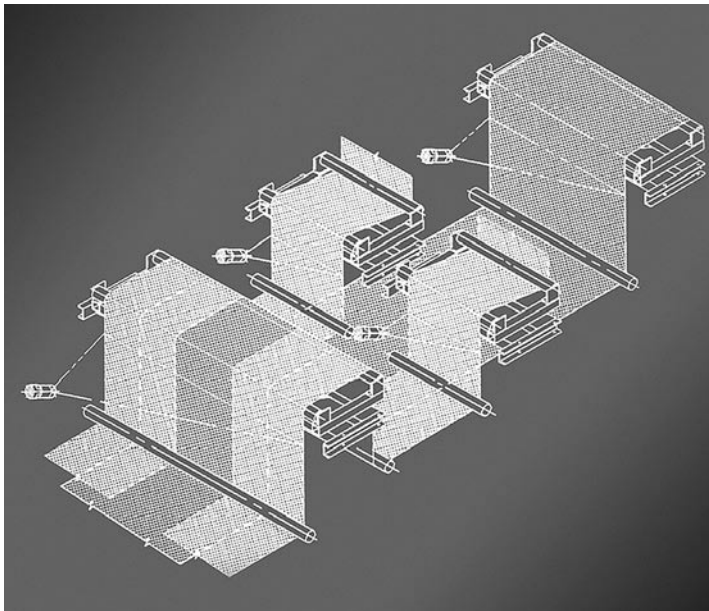
The output of the measured positions is by numerical value of exposed or unexposed pixels or by calibrated value in mm. The camera acquires variations in contrast based on edges, colour contrasts, light/shadow transitions or on thin spots of material and surface structures.

The following scanning and setting modes may be selected:

- Edge 1 (contrast variation 1)
- Select from 60 edges in and 60 edges against scanning direction
- Edge 2 (contrast variation 2)
- Select from 60 edges in and 60 edges against scanning direction
- Distance between edge and reference position
- Emergency criteria
- e.g. switch to edge if line is lost
- Setting the transmitting speed
- Switch off automatic exposure control; exposure set manually
- Request actual scanning frequency
- Setting upper and lower threshold values
- Setting parameters for filter

All these parameters can be changed even during interface operation. The parameters set are stored on an EEPROM; they are not destroyed by voltage loss.

The operator panel is used to set the CAN address, focus the camera and for displaying the results of the camera evaluations.

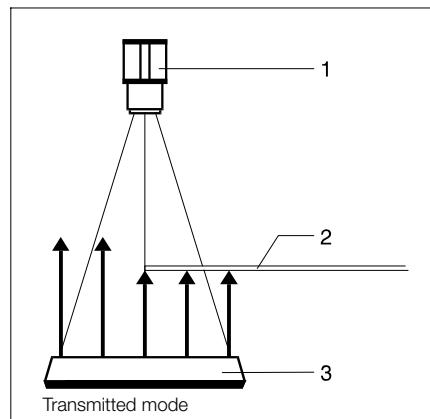


Laminating process using 4 networked cameras

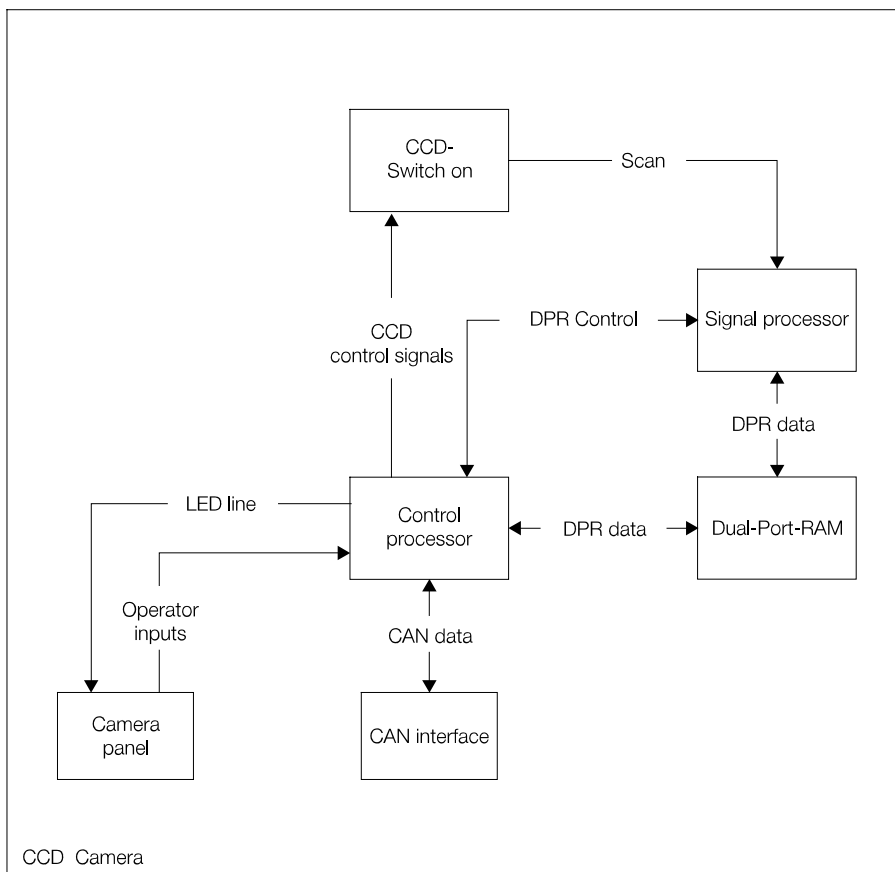
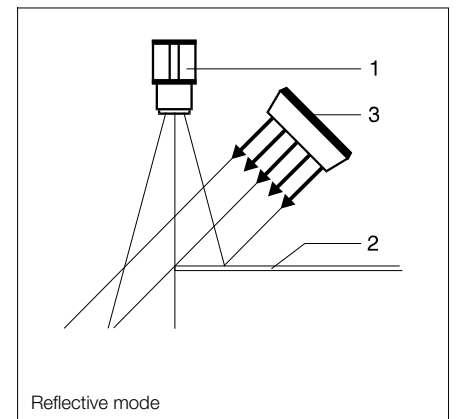
### Measuring mode

The camera targets the selected events or objects and creates a corresponding image on the diode array. Depending on the application, one of two sensing principles is used:

In the transmitted mode, the light source is behind the object to be scanned. On solid materials only the outer edge can be sensed.



In the reflective mode, the light is reflected back from the web. Using this principle, lines, grooves, channels or ribs can be sensed in addition to the outer edge.



### Interfaces

Various interfaces are available for integrating the camera into existing control systems.

- Parallel interface connects to PLC
- Serial interface RS 232 C/RS 422
- Interbus S
- Arcnet
- CAN for Siemens S5 bus for 95/100 U
- CAN for Siemens S5 bus for 115/135/155 U

Connection to Erhardt + Leimer controllers is directly by CAN bus.

The camera captive range and distance between the camera and web is calculated as follows:

$$K = G \left( \frac{A}{f} - 1 \right)$$

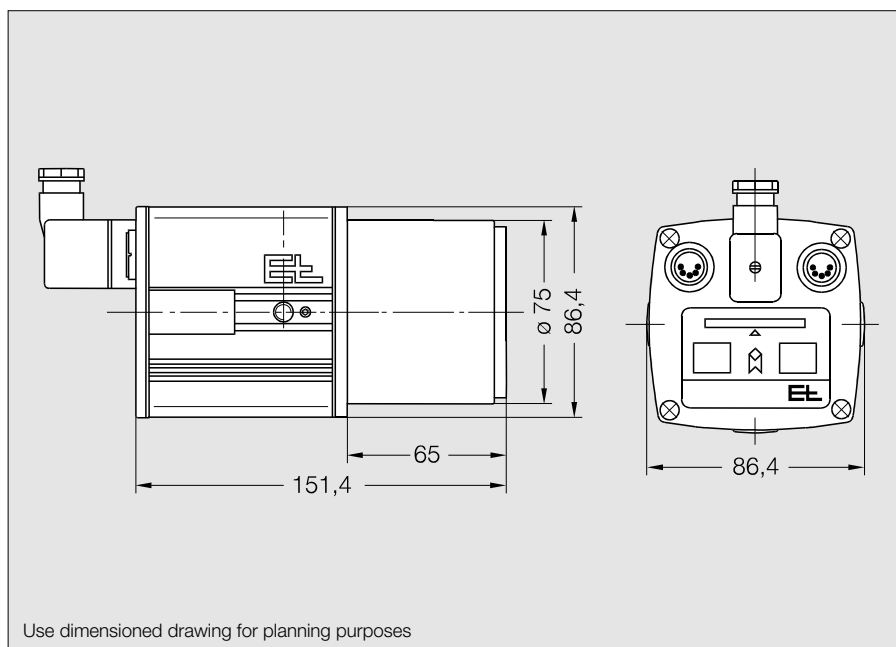
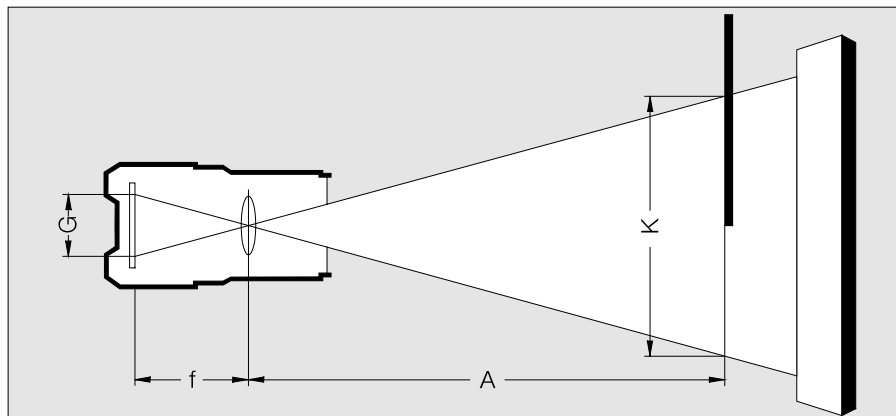
$$A = \frac{f \cdot (K + G)}{G}$$

- K camera captive range (mm)  
G CCD element length (28.67 mm)  
A distance camera to web (mm)  
f lens focal length (mm)

### Features

Resolution =  $\frac{\text{measuring range}}{8192}$

- Function optimised scan rate
- Data output frequency 200 Hz
- Automatic exposure control can be activated to compensate for lens contamination and ensure long term consistent performance.
- Camera contamination constantly monitored
- Various distances and measuring ranges thanks to interchangeable lenses
- High light sensitivity in the visual spectrum as well as in the low infra-red range
- Digital signal processor
- Filtered signal
- Multimaster CAN interface
- Request edge positions by coded digital inputs or via serial or bus interface
- Request codes changed even during operation
- Direct compatibility with controller
- Self-diagnostic
- PC program for local function control or via modem



### Our experience

- Over fifteen years experience in the development and application know-how of linear array cameras
- Successful reference systems in many industries
- Over 2000 cameras in the field
- Single source supplier for complete systems, from consultation through to integration into your processing range
- Worldwide service on hand. Service support in all major industrial countries.

### Technical Data OL 80

Supply voltage	20 - 30 V DC
Power rating	5,5 W
Protection class	max. IP 65 with suitable connector inserted
Ambient temperature	- 10 to + 50 °C
Storing temperature	- 25 to + 80 °C
Scan frequency	max. 700 Hz
Cycle time	5 ms
Number of pixel	2048
Resolution	8192
Pixel size	14 x 14 µm
Chip length	28,67
Lens	28 mm and 50 mm
Spectral range	300 to 1000 nm
Optimum sensitivity	500 nm
Housing	aluminum
Weight	1100 g
Interface	CAN-Bus
Max. cable length in CAN network	250 m

Subject to technical modifications without notice