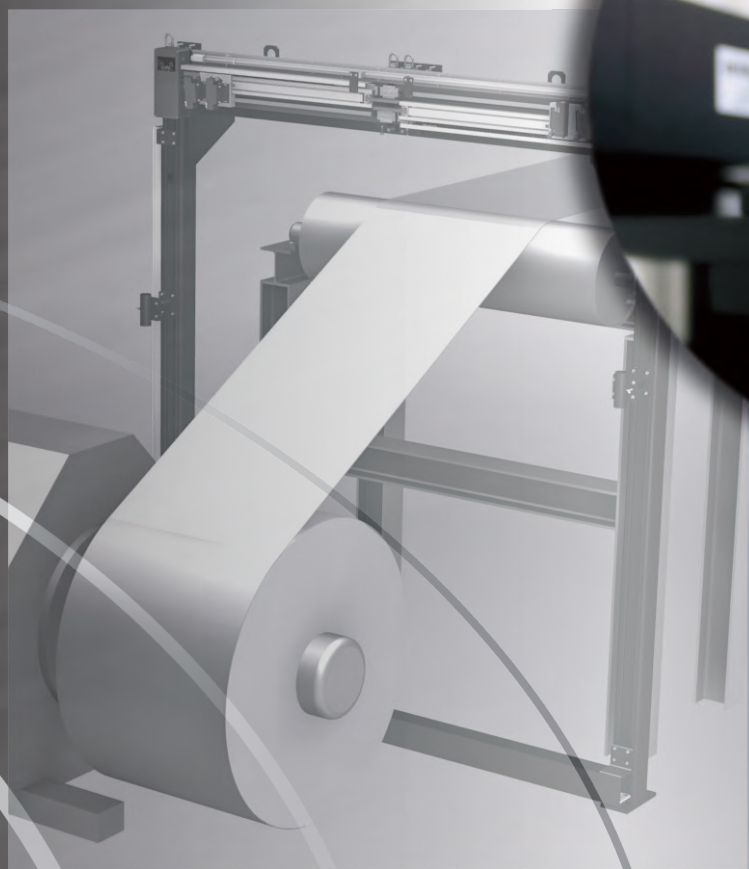
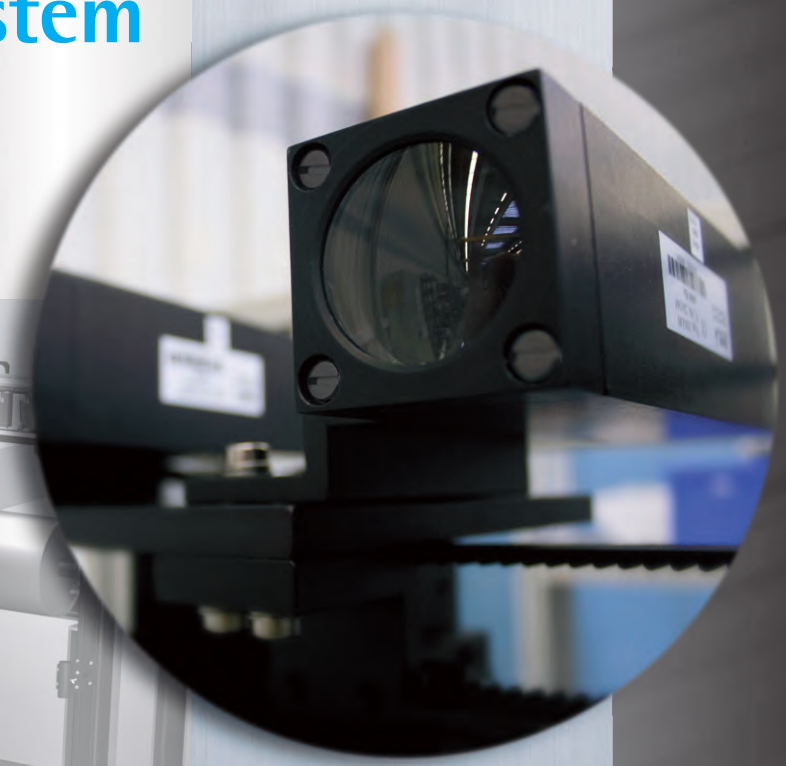
EMG

EVK/EVM

Optical strip edge and centre guiding system





- high-precision
- reliable
- easy to maintain

EVK/EVM Continuous strip edge / strip

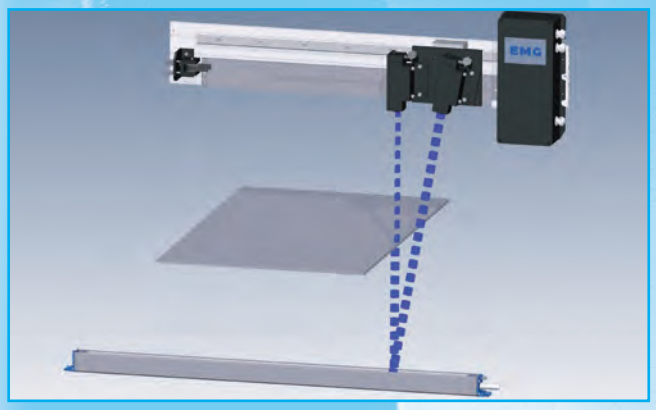
Operating principle:

The EVK edge sensor positioning device and the EVM centre sensor positioning device are used for the non-contact strip edge and strip centre guiding of steel strips. The device, which is highly reliable and unsusceptible to external interference, visually detects changes in the edge and/or centre position of the strip.

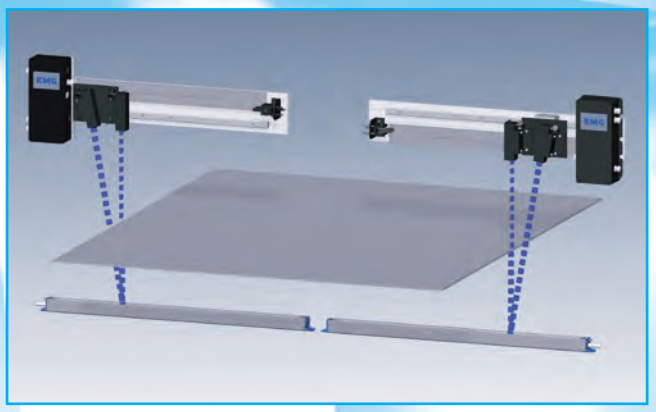
The strip edge is detected via a motorised, mobile sensor positioning device that is equipped with high-frequency (HF) alternating light measuring systems LS 13/14, which are protected against ambient light. If the strip edge is displaced due to a change in strip width or a lateral strip deviation, this is detected by the photocells.

The superordinate control electronics then activates the DC motor to move the LS 13/14 or the actuator (servo valve or electro-servo-cylinder) of the control circuit, in order to ensure that the strip edge always covers half of the measuring range of the photocell.

Contamination of the light emitters is compensated by applying the reference measuring principle. This involves each measuring system using a measuring receiver and a reference receiver directed to the same light spot of the light emitter (e.g. LLS). While the measuring receiver detects the lateral position of the strip edge, the reference receiver measures the background brightness of the light spot.

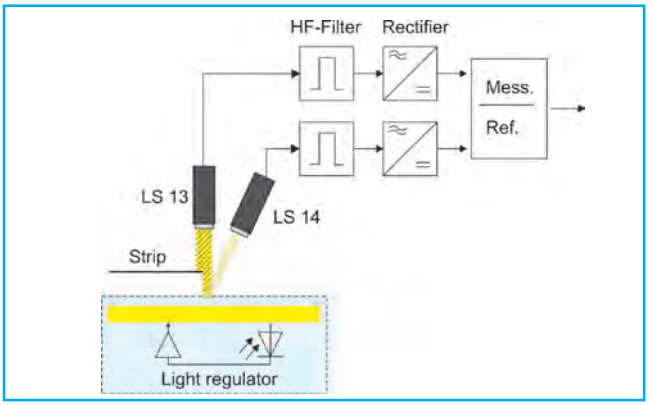


Optical measuring principle EVK edge measurement



Strip centre guiding with two EVK systems

EMG Automation GmbH specialises in the automation of continuous production processes in the metal, paper and plastics industries as well as in the foil and tyre industries. The company, which was established in 1946, is a leading provider of electro hydraulic control systems. Furthermore, EMG provides quality assurance systems for the manufacturing industry. Based on the combination of more than 60 years of experience, the quality of our products and complete solutions as well as our advisory skills, our customer, by his trust, makes us the market leader.
In close co-operation with our customers, research facilities and universities, we are permanently searching for innovative solutions to promote our new and further developments and therefore to design and actively form the market as innovation leader.



Principal representation of signal processing using the reference measuring principle

centre guiding system • high-precision

Application:

EVK:
The EVK sensor positioning device is used for strip edge detection in strip processing lines. Standard applications include strip edge and strip centre guiding systems (two EVKs required) for steel strips.

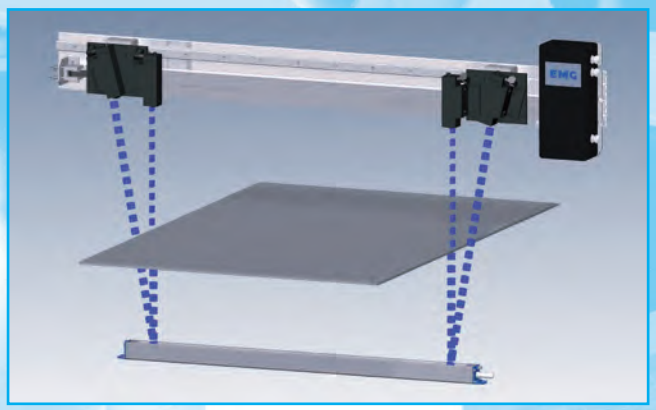
EVM:
The EVM centre sensor positioning device is used for strip centre detection in strip processing lines. Standard applications include strip centre guiding systems for steel strips. In guiding systems with the EVM positioning device a maximum strip centre offset of +/- 8 mm is possible.

Application examples of EVK and EVM:

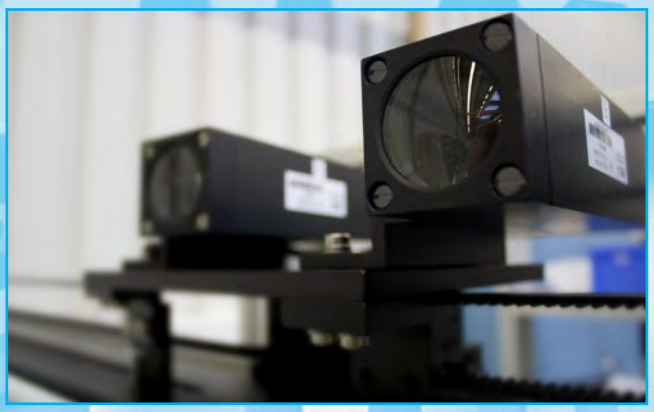
EVK:
- edge guiding on recoiler
- edge guiding on uncoiler (shearing line)
- strip centering used for strip movements larger than 8 mm

EVM:
- strip centre guiding typically on uncoiler
- in case of limited space in the line

2 x EVK:
- strip centre guiding on uncoiler
- used on the side trimmer
- used for strip movements larger than 8 mm



Optical measuring principle EVM strip centre guiding system


Alternating light measuring receiver LS 13/14

Technical data EVK/EVM:

- output: < 50 VA per drive unit
- interface: CANopen
- protection type: IP 54
- ambient temperature during operation: 0...+50 °C
- measuring accuracy: < 1.0 mm
- supply voltage: 24 V DC / 0.5 A (initial current <4 A)

Features and customer benefits:

- precise and reliable measuring accuracy, as the system is insensitive to deviations in strip height
- high reliability and easy operation
- state of the art fieldbus technology (all common bus systems)
- short commissioning time thanks to quick and simple installation (minimal installation space)
- active dirt compensation through reference measuring principle
- also suitable for use in harsh environments (e.g. pickling, cold rolling, etc.)
- protected against ambient light through use of HF alternating light
- distance between sensor and light source up to 4 m

• reliable

Alternating light measuring receiver:

The LS 13 and LS 14 alternating light measuring receivers are designed as photoelectric edge sensors with a large measuring distance between the light emitter and measuring receiver. The effects of DC light, and thus extraneous light, are largely eliminated by the alternating light. The LS 13 is used as a measuring receiver and the LS 14 is used as a reference receiver.

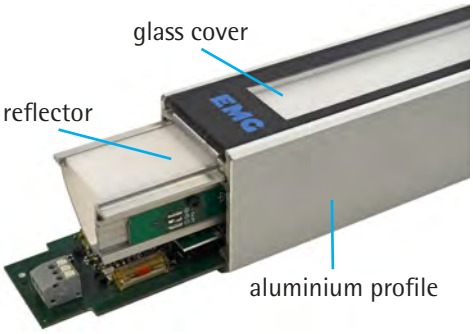
The HF light (2 kHz) emitted by an external alternating light emitter (e.g. LLS) is transmitted via the front lens to a photoelectric element. The internal electronics generates an output voltage proportional to the incident light. Almost proportional to the ingression of one strip edge into the light beam, the zero-potential output voltage U_A is changed.

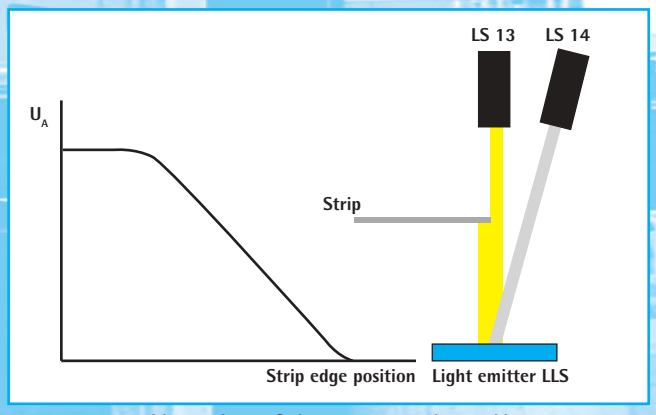
• easy to maintain

Linear light source LLS:

The **LLS** **l**inear **l**ight **s**ource is used along with the EVK or EVM systems for optical strip position sensing and has an expected service life of approximately 50,000 hours.

The energy-saving LED light emitter with integrated reflector for homogenous light distribution is housed in a rugged aluminium profile with glass cover.





Alteration of the output voltage U_A

Linear light source LLS

Technical data LS 13/14:

- controlled supply voltage: +/- 15 V
- supply current: approx. 3 mA
- resolution: infinite
- ambient temperature during operation: 0...+50 °C
- protection class: IP 65

Technical data LLS:

- controlled supply voltage: 24 V DC (22 V DC up to 28 V DC at LLS connector)
- ambient temperature during operation: 0...+50 °C
- protection class: IP 65 (water influences the optical characteristics of the light source), (option: IP65 + IP67)
- EMC emitted interference: group 1, class A
- EMC interference immunity: industrial applications
- connection via supplied plug (0.75 mm^2)
- available in four different lengths
  - LLS 475* / 675* / 875* / 1075* / 1275*

(* name corresponds to the usable area in mm)