

Progressive Code A.N.	Product	Date
AN_06	Micron and EOS2	31/10/2014
Application	Vertical automatic storage	
Description	Combined application of EOS safety light curtains and Micron measurement light curtains	

## Request

The following application has been developed for the "System Logistics" (one of the leading manufacturers of automatic storage systems worldwide) new generation of the vertical shelving system: "Modula Lift".

At this link <http://www.modula.eu/ita/multimedia-video.php> you can watch a video showing the operation of this automatic vertical storage.

The metal drawers are picked up and stored in picking bays by means of an automatic elevator fully managed by a hardware and software system that integrates all the machine measurement and safety functions.

The customer has highlighted specific structural requirements regarding safety light curtains:

- reduced cross section in order to incorporate the safety light curtains in the structure of the machine;
- vertical and horizontal protection of the dangerous area of the machine with external bays.

Functional requirements, with regard to the measurement light curtains, were the following:

- guarantee of homogeneous reading at any position of the drawer: left side, right side and center;
- capability to detect small objects (even less than 4 mm) during the passage, in quick motion of the drawer, in front of the measurement light curtain;
- immunity to optical reflections;
- serial output.

## Achievement

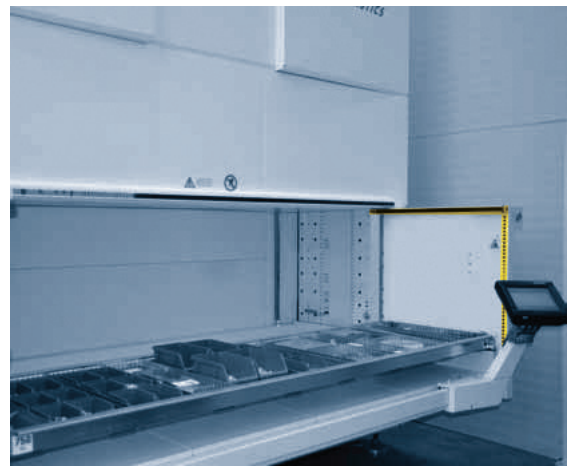
### Safety

The Reer EOS2 Model, with its reduced section, meets the first requirement of the customer to integrate the light curtains in the machine structure.

As seen in the figure, the light curtains are integrated into the protection shields of the machine.

The "L" position of the light curtains allows a vertical and horizontal protection of the dangerous zone.

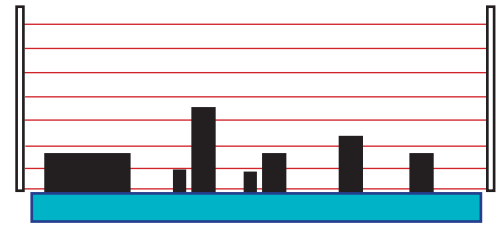
In this solution are used Master and Slave models with 30 mm resolution. The controlled height depend on the size of the machine.



Safety light curtains location

## Measurement

The system must be able to measure the maximum height of objects placed in the drawer.

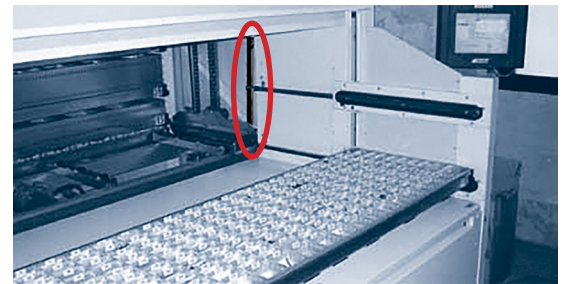


Measurement

For this detection is used a measurement light curtain placed inside the automatic storage as shown in the figure.

This measurement should be homogeneous at all points of the drawer: left side, right side and in the center.

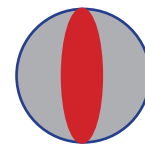
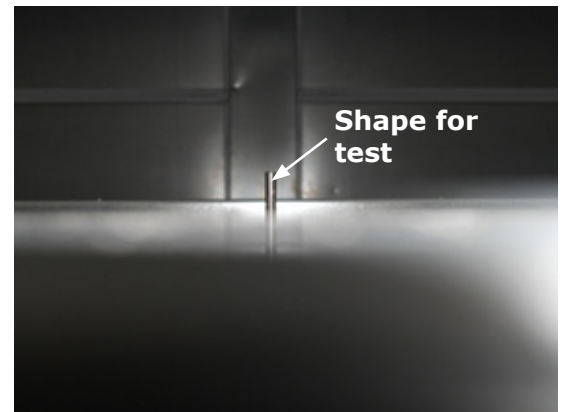
The MICRON MI 752 BD measurement light curtain, with 25 mm resolution, used in this application perfectly meets this requirement.



Measurement light curtains location

The second request concerns the drawer maximum speed of passage, once the acceleration, varies from 440 mm/sec to 575 mm/sec depending on the model of automatic storage.

Thanks diaphragmed optics MICRON is able to detect, without any error, objects with 4 mm diameter in quick motion.

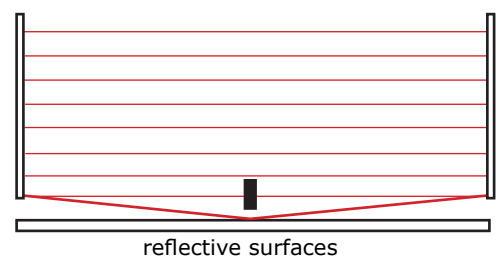


Lens with optical diaphragmed

Immunity of the measurement light curtain to optical reflections.

The optics with reduced divergence, typical in safety light curtains, also used in the MICRON measurement light curtains provides excellent immunity to interference from reflective surfaces, avoiding reading errors. This allows a high reliability of measurement.

The MICRON light curtain also uses a serial communication protocol "customizable" according to the customer's needs.



Reflection example

Below are listed some vertical storage manufacturers.

Country	Company Name	City	Web site
Finland	Cimcorp	Ulvila	<a href="http://www.cimcorp.com/">http://www.cimcorp.com/</a>
France	Electroclass	Bussy Saint Georges	<a href="http://www.electroclass.com/">http://www.electroclass.com/</a>
Germany	KASTO Maschinenbau GmbH & Co. KG	Achern	<a href="http://www.kasto.com">http://www.kasto.com</a>
	Jungheinrich AG	Hamburg	<a href="http://www.jungheinrich.com/en/home-page/">http://www.jungheinrich.com/en/home-page/</a>
	INTERTEX-Maschinenbau	Eislingen	<a href="http://www.intertex.biz/">http://www.intertex.biz/</a>
	Hänel	Bad Friedrichshall	<a href="http://www.hanel.us">http://www.hanel.us</a>
Nederland	Vanderlande Industries B.V.	Veghel	<a href="http://www.vanderlande.com/home-en.htm">http://www.vanderlande.com/home-en.htm</a>
Norway	Constructor Group AS	Sandvika	<a href="http://constructor-group.com/">http://constructor-group.com/</a>
Sweden	WELAND AB	Smålandsstenar	<a href="http://www.weland.se/">http://www.weland.se/</a>
Switzerland	Kardex Group	Zurich	<a href="http://www.kardex.com/en.html">http://www.kardex.com/en.html</a>
	LISTA	Erlen	<a href="http://www.lista.com/it-it/">http://www.lista.com/it-it/</a>
U.K.	AZoRobotics	Cheshire	<a href="http://www.azorobotics.com/">http://www.azorobotics.com/</a>
	Dexion	Swindon	<a href="http://www.dexion.co.uk/">http://www.dexion.co.uk/</a>
U.S.A. Texas	Southwest Solutions Group	Austin	<a href="http://www.southwestsolutions.com/">http://www.southwestsolutions.com/</a>
U.S.A. NC	MHI	Charlotte	<a href="http://www.mhi.org/">http://www.mhi.org/</a>