

Laser distance sensor OADM

Overview

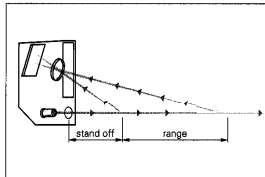
The new OADM is a family of laser distance sensors featuring versions that cover ranges from 20 to 400 mm. The compact sensors with an integrated micro controller provide a precise output signal, that is proportional to the measured distance, no external evaluation box is needed. Intelligent internal signal analysis enables the sensors to

work accurately regardless of color and on most surfaces.

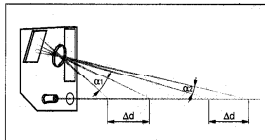
With the small visible laser spot the sensors can always be positioned easily and accurately. Distances to rough surfaces can be measured reliably using fine line instead of the laser spot, thus averaging across a larger area.

Measuring principle

The optical principal is based on triangulation. The laser puts a small bright spot on the object. The receiver of the sensor detects the position of this spot. The angle increases with the distance of the object. The sensor basically measures this angle and then calculates the distance.



The possible resolution and accuracy changes with distance. The same distance Δd , that causes a large angular change α_1 close to the sensor, causes a much smaller angular change α_2 further away (see figure).



The receiver inside the sensor is a linear photo diode array or in the faster versions a PSD. The photodiode array is scanned by the built in micro controller. From the distribution of light along the diode array the controller precisely calculates the angle and from the angle it calculates the distance of the object. This distance is either trans-

ferred to the serial port or converted to a distance-proportional output current. The microcontroller assures high linearity and precision of the measurement. The combination of photo diode array and micro controller allows for suppression of disturbing reflections thus providing reliable data on critical surfaces. The sensor adapts to different colors by changing its internal sensitivity, making it nearly independent of the color of the object.

A digital output is activated when no object is present within the measuring range. Another digital output activates an alarm, if there is not enough light to detect an object correctly e.g. the sensor is soiled.

Applications

This sensor family, with its variety of measuring ranges, can be used in many applications.

Typical applications are position, displacement and thickness measurement.

In some applications there are objects with rough and uneven surfaces to measure. Sometimes the object surface has even small holes or gaps. Such objects are easily handled with the option of a laser line optics delivering a fine laser line instead of the narrow focused laser beam.

As for all sensors using triangulation, the laser spot should be positioned in the line of sight of the receiving optics.

As a simple rule, the distance between sensor and objects shall be chosen as small as possible for each application. The shorter the range the higher (more than proportional) the resolution and accuracy.

Applications

• Red Laser light

The small and highly visible laser spot provides a precise sensing point for easy visual alignment of the sensor even on small objects.

• Built in micro controller

The built in micro controller eliminates the need of an external control unit and makes it easy to place the sensor wherever it is needed. It can transmit the data via serial port without any digitizing error.

• Surface independent

The linear photo diode array improves measurements on critical surfaces by sophisticated signal processing.

• Variety of ranges

The same compact housing contains measuring ranges from 20 to 400 mm.

• High resolution and accuracy

Resolutions of 0,05 to 0,15 %, corresponding 0,01 to 0,5 mm, at 10 ms measuring time and high accuracy have been achieved by using the photodiode array.