OPTOFORCE

SENSING FLEXIBILITY

Unique features

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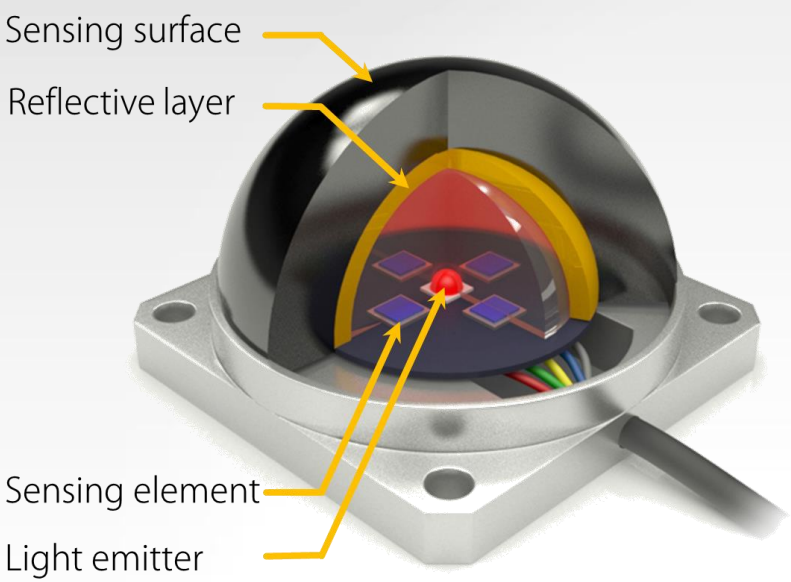
OptoForce sensors are based on a new technology, with distinct properties.

You can find information here about:

- The principles
- Silicones – compliance, abrasion, hysteresis
- Shapes and sensing surfaces
- Measurement ranges and overload
- Non-linearity and cross-talk

The Principles

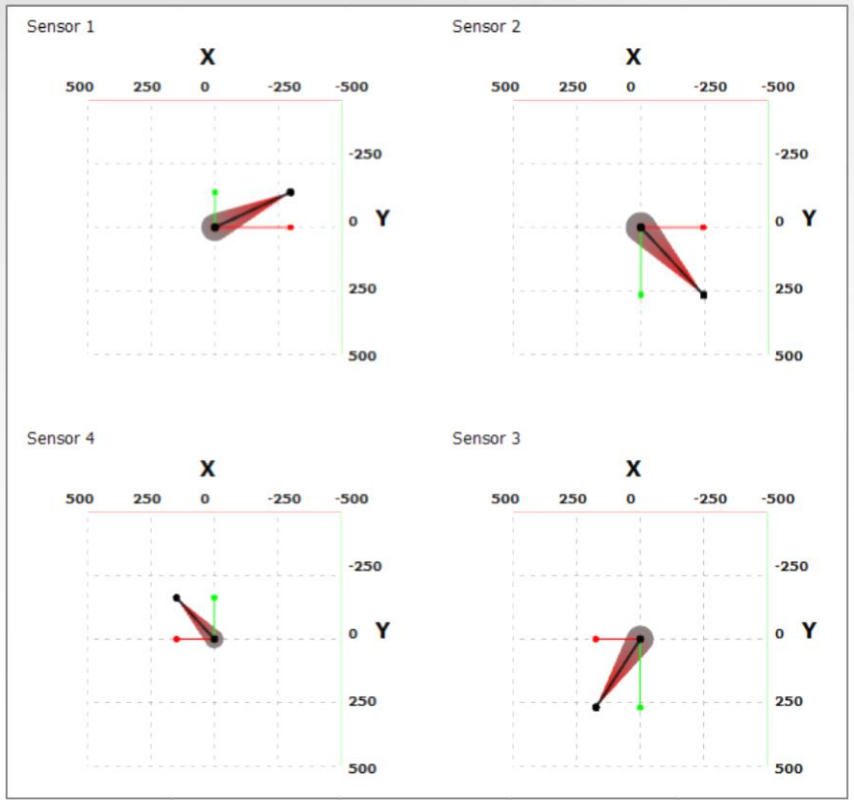


Unlike in other technologies, OptoForce sensors have only one structure for measuring deformation along the 3-axes (X, Y, Z).

Photodiodes are measuring the amount of reflected light, originally emitted by the LED.

By comparing the differences we know, how the structure was deformed.

The Principles



By using an array of 3-axis sensors, we can create a combined 6-axis sensor as well.

6-axis sensors can not only measure the lateral forces, but also the rotations around the X, Y and Z vectors.

Using the same principle we can also precisely estimate contact points – which would not be possible with another 6-axis sensor.

Silicones

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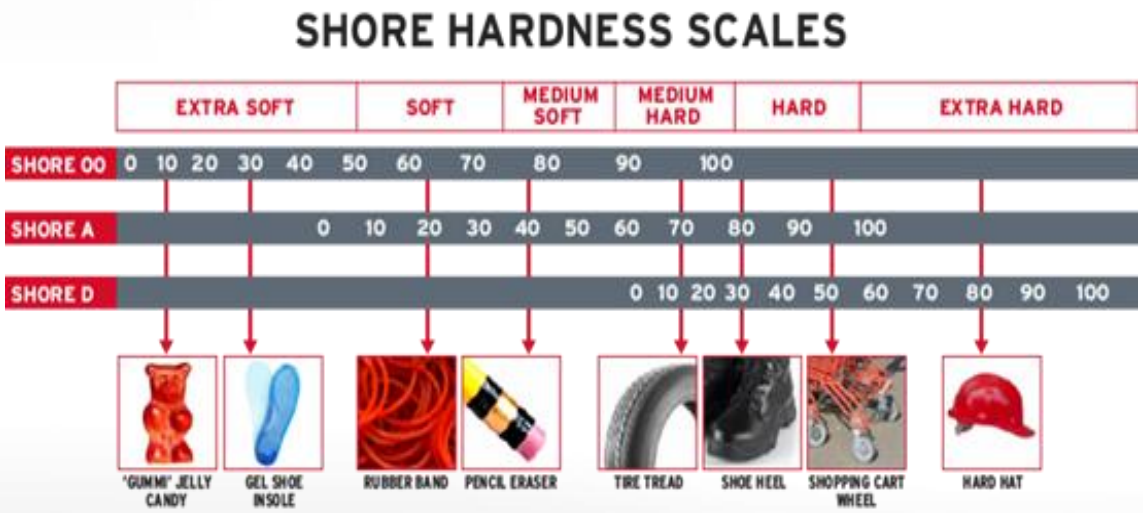
Hysteresis, deformation

Compression set values were the most important, when we selected our new additional type silicones, so that hysteresis and plastic deformation became negligible.



Temperature

Our optical grade silicones can withstand temperatures between -40°C - +200°C.

Abrasion

Our standard materials have a Shore A hardness between 50 to 87. So they are as abrasion resistant as a shoe heel.

Compliance

The max. deformation of our sensors are between 1-3mm – depending on the model.

Shapes and sensing surfaces

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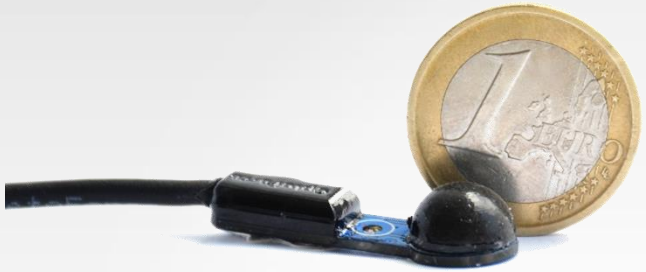
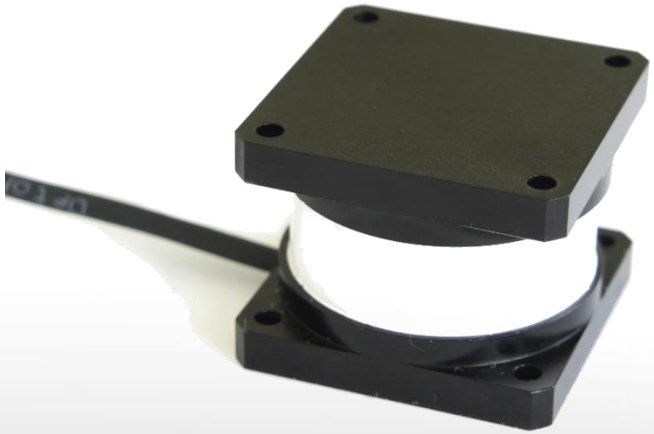


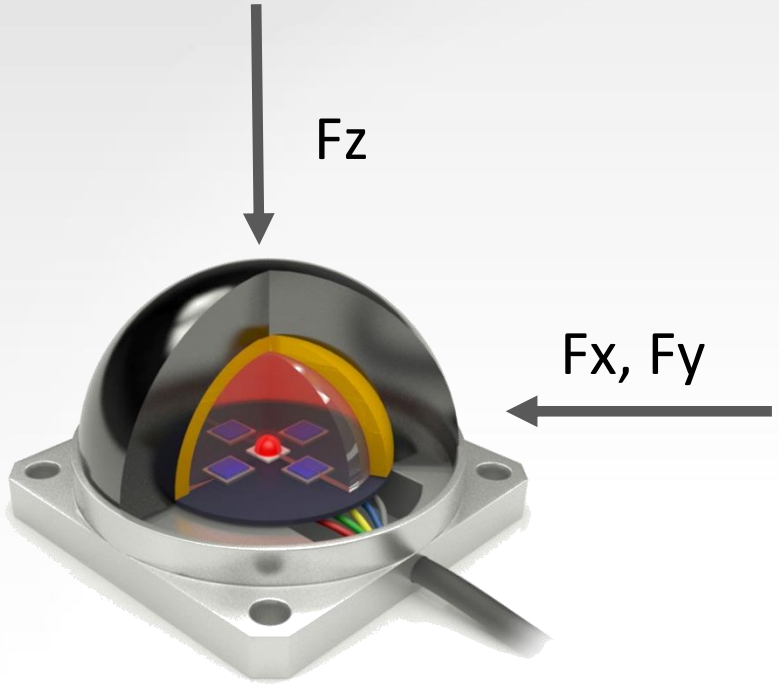


While the internal structure is always hemispherical, we have a wide range of options to customise the outer shape.

An important feature of our sensors is that they are sensitive on their entire surface.

In one example, we even programmed 4 individual buttons and a 3D joystick on one single sensor – see in red on the left.

Measurement ranges and overload



The nominal capacities of our sensors range from 10N to a few thousand newtons.

When you are compressing the sensors in Fz, the silicone is protecting the sensors – our sensors are almost indestructible.

In Fx, Fy the silicone is being sheared off the base, so here the overload is limited to 200% - which is still more than what an average strain gauge sensor offers.

In all cases, building a mechanical hard stop is cheap and easy.

Non-linearity and cross-talk

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Non-linearity

Non-linearity is defined as the maximum error from an ideal linear output on the total measurement range. Our non-linearity values range from 1% - 5% depending on the model – upon request we do integrated software compensation, ranging from 0.1% - 1.5%.

Cross-talk

Cross-talk is measuring how measurements along one axis create an error along other axes. Our cross-talk values are normally below 1-3% and depend on the shape and material. With integrated software compensation it can be improved to be below 1%.

Any further question?

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Do you have any questions left?

Please send us an e-mail to info@optoforce.com!

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