OPTOFORCE
Sensing Flexibility

PRELIMINARY TECHNICAL DATASHEET

OMD - 3D Force Sensor

(product photo)

BENEFITS

- Precise measurement
- Force measurement in 3D
- High resolution
- Low chemical reactivity
- Highly adaptable product design
- Dust and water proof
- High overload range
- Robust design and easy to use
- Highly reliable
- Low power consumption
- High sensitivity

TECHNICAL DATA

Sensing surface:

Silicone rubber

Sensor base:

Epoxy and ABS like plastic or metal

Operation temperature

plastic base version: -10 °C to 40 °C

metal base version: -40 °C to 85 °C

Measurement accuracy

Linearity < 0.1% at 23 °C

Safe overload 600% of N.C (Fz)

DAQ – DATA ACQUSATION HARDWARE

The analog signals generated by the OMD are digitalized and pre-processed (using advanced noise filtering technology) by the Data Acquisition (DAQ) board to prepare the data for analyzing and recording on a personal computer. The DAQ board can be connected to your PC by standard USB interface.

Main features:

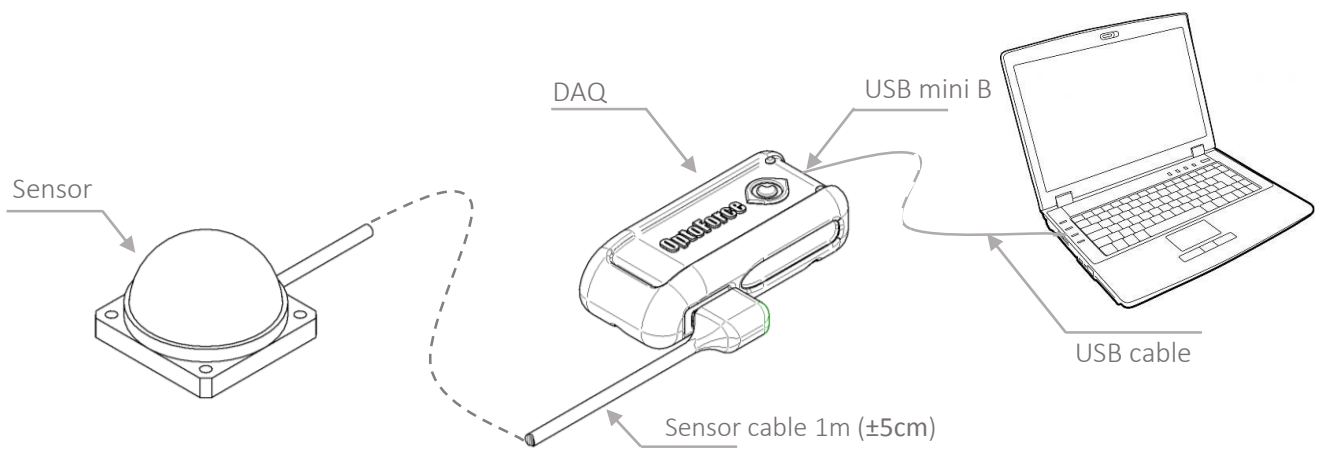
- Easy to use standard USB interface
- Small dimension
- Integrated noise filtering

DAQ-software:

OptoForce provides software components with the DAQ that you can use to build your application as well as a sample application program for visualization of the measured data.
The software components are optimized for high-speed data transfer.

Software component features:

- Real-time data visualization
- Vector representation
- Measurement results can be recorded
- Code samples for custom code implementation

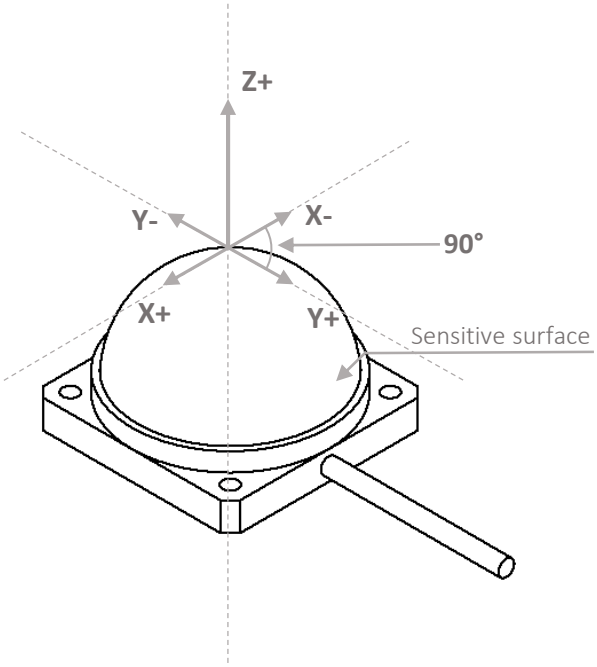


NOTES

The DAQ visualization software can be downloaded from: *http://optoforce.com/software*.

OMD – OPRTOFORCE MEASUREMENT DEVICE

OMD D30H15O45B15T9I615



PRODUCT DESCRIPTION

One of the first 3D compliant force sensor

Its complaint surface makes it prone to contact with different sized objects

Large sensitive area

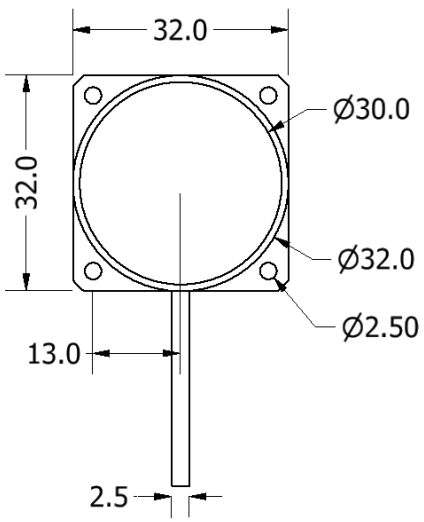
The sensing area is the whole surface of the silicone dome

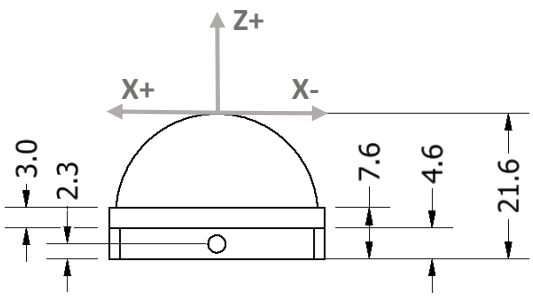
Corrosion resistance

This package also provides excellent corrosion resistance and isolation to external package stress

Typical application

- Smart handling
- Robotic hand and robotic legs
- Load and compression sensing
- Automation and control





Note: All dimensions are in mm unless otherwise specified

NOTES

Please note that the life span of these units can be reduced considerably if they are used in extreme conditions (e.g. with high grinding surfaces, exceeded temperature range). We cannot be held responsible in such cases. Solutions do exist for many problems – please contact us to find out more.

TECHNICAL PARAMETERS

OPERATING SPECIFICATION

Parameter	Value	On request	Unit
Operating voltage	5	3 - 24	V
Operating current and method[1]	40	< 1 (can be battery operated too)	mA
Sensor output	analog	pre-amplified, digital, wireless	
DAQ	separate	integrated	
Maximum resolution[2]	16	20	bits
Nominal capacity (Fz)[3]	150	10 – 300 000	N
Nominal capacity (Fx,Fy)[3]	100	10 – 300 000	N
Safe overload (Fz)	600	600	% of N.C.
Linearity[4]	< 1	< 0.1	%
Noise level[5]	< 2	< 1	LSB
Nominal sample rate[6]	100	50 000	Hz
Temperature[7]	-10 to 40	-40 to 85	°C
Sensor diameter[8]	30	10 -	mm
Sensor shape	Dome	Any	
Sensor weight (with cable)	28	5 -	g

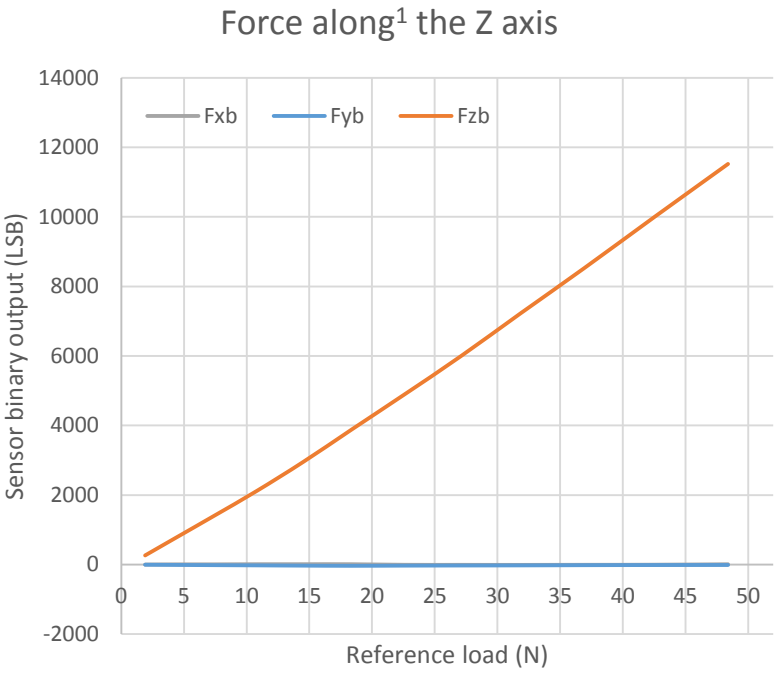
NOTES

All specifications are subject to change, parameters were measured at 23°C and up to 5kg (50N).

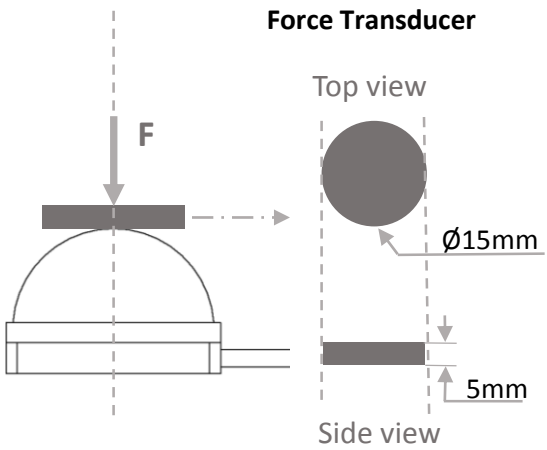
1. Current consumption including the OMD sensor (10mA) and DAQ board (30mA), however OMD sensor with low current operation (<1mA) also plausible
2. Using the OptoForce recommended DAQ board, that is part of the development kit.
3. The load range is dependent on the chosen material of the silicone sensing surface
4. Evaluated up to 5kg (50N)
5. At nominal sampling rate.
6. Increasing sampling rate have negative effect on noise performance, this range also could be extended.
7. Note that higher temperature version is available on request.
8. Not just the sensor diameter but also the shape of the surface can be customized.

TECHNICAL PARAMETERS

OMD D30H15O45B15T9I82



MEASUREMENT CONDITION



NOTES

All force related specifications are established using dead weight:

1. measurements were evaluated up to 5kg (50N)

SENSOR DESIGN NOTES

The versatility of the OMD sensor makes it easily scalable (fingertip or palm sized) and customizable, thus OptoForce is keen to help developers by offering high freedom in the sensor design.

The following sensor physical parameters can be customized:

- **Surface size and diameter** –smaller or bigger, even highly flattened sensor can be made
- **Surface material** - silicone, polyurethane or even metallic materials
- **Surface look** - can be dotted, lined or can have any surface
- **Surface shape** - cube, pyramid or any shape is plausible even convex or concave
- **Measurement range** - by changing the hardness of the silicone
- **Sensor base** - can be metal or other plastic
- **Sensor fixture** - hole size or position and even the shape

OptoForce's goal is to help and enable customers to design and create their own end-product solutions that meet applicable functional standards and requirements with the help of the OMD.

For more information please do not hesitate to contact us at:
info@optoforce.com

General Note

We would like to highlight that the sensor described in this datasheet is a prototype yet, manually produced and rather to demonstrate its features then to consider final, mass produced product.