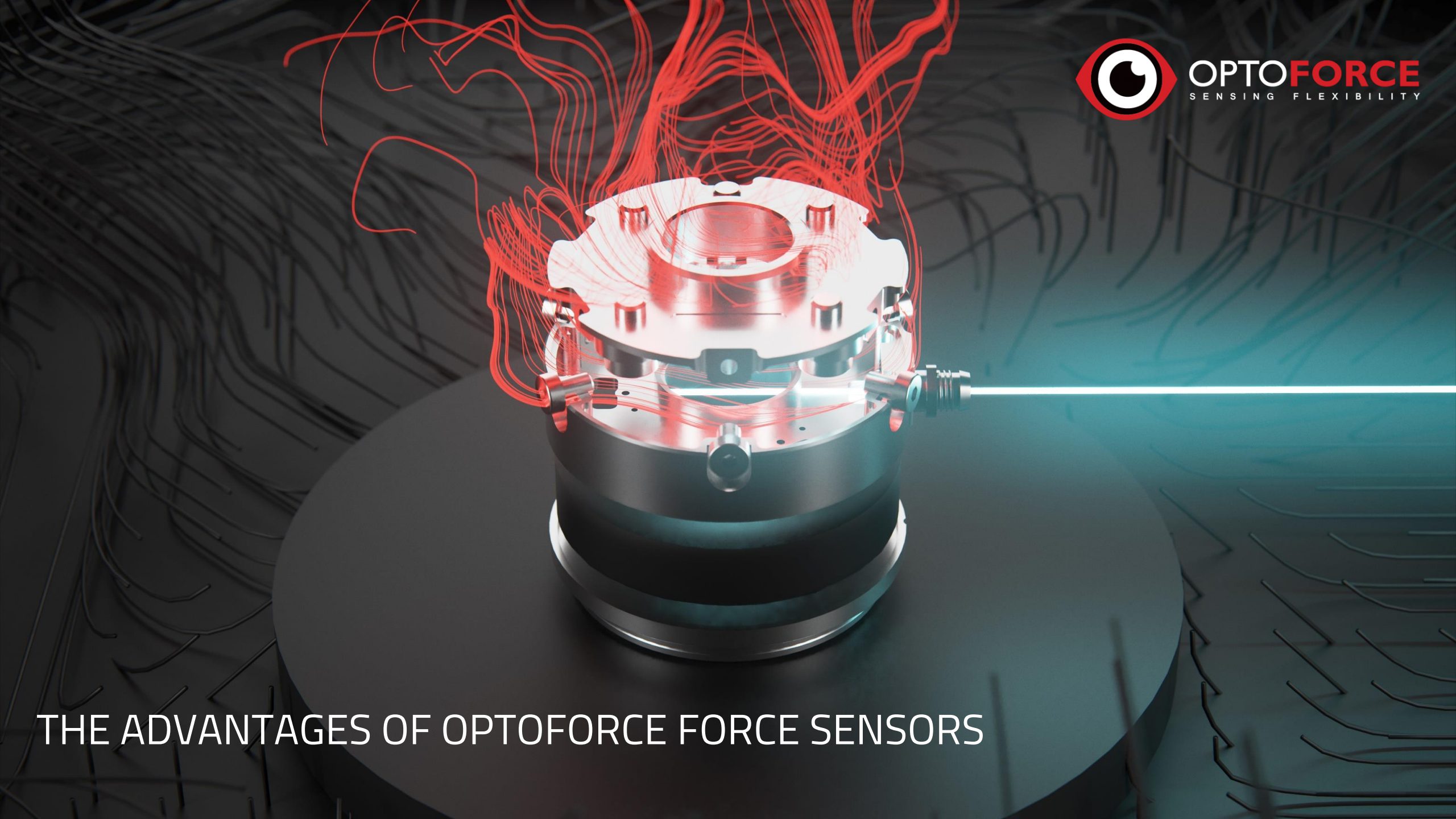
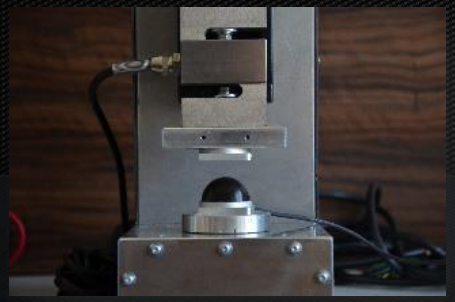

OPTOFORCE
SENSING FLEXIBILITY
THE ADVANTAGES OF OPTOFORCE FORCE SENSORS

DURABILITY

Do you find it impractical to use fragile, and easy to break sensors in fenceless robotics?

OptoForce sensors represent – regardless of the application – durability and robustness. On numerous occasions, potential clients have come to us, saying, that they have already broken multiple highly valuable F/T sensors manufactured by other companies, because of overload and higher impact forces. Thanks to the highly deformative property of silicone, OptoForce sensors guarantee precise measurements even up to 200% overload. Even after total deformation during 600% overload, the silicone regains its original form, and is able to measure forces with the same precision, without any permanent damage whatsoever.



BEFORE OVERLOAD TEST

DURING OVERLOAD TEST

AFTER OVERLOAD TEST

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A VARIETY OF SOLUTIONS

Where can I use OptoForce sensors?

Depending on the application, there is a wide range of uses for both the 3 and 6 axis OptoForce sensors. The 3 axis sensors are highly popular in academia, applied usually with an end effector of a robot arm. In a case like this, the hand adapter would be used to manipulate objects, such as a human hand would, like holding a glass of liquid as it is being filled.

When it comes to 6 axis sensors, industrial automation applications that require human hand dexterity can greatly benefit. From teach in, and hand guidance tasks, peg insertion or pin-in-the-hole tasks, all the way to arc welding, OptoForce sensors can provide a cheap, but smart solution. For a full list of possible applications, please take a look at our website at: www.optoforce.com

Our sensors for the Universal Robots are available with an Ethernet interface. We provide the UR script that reads the force/torque values (in N/Nm), which can be used in a UR program.

Actual projects we are currently working on, include plastic parting line removal, obstacle detection for a major car manufacturing company, and a center point insertion application for a car part supplier, where the task of the robot is to insert a mirror, completely centered, onto a side mirror housing.

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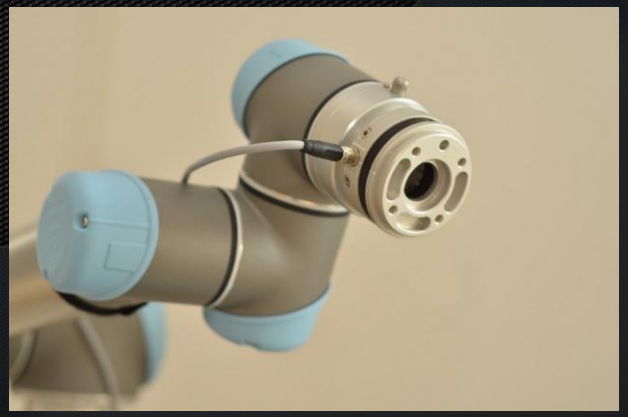
COMPETITIVE PRICE

Do you find quality force, force/torque sensors unexplainably expensive?

Another advantage to using OptoForce sensors, are its prices and value for money. Compared to our competitors, our low prices give access to highly precise force/torque sensors to everybody, with prompt delivery. As a price guarantee, if you can find a cheaper sensor than our OptoForce sensors (in the same quality category), we'll match that price.



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COMPARISON: SIGNAL SPECIFICATIONS 1.

Robotiq – Wacoh-Tech - OptoForce

	OptoForce HEX-70-XE-200N	**OptoForce HEX-70-XE-1000N**	**Robotiq FT 150**	**Robotiq FT 300**	**Wacoh DynPick 1000N**
Signal	High quality signal filter present	High quality signal filter present	High quality signal Immune to electric noise, no filter	High quality signal Immune to electric noise, no filter	Correction by built in 32-bit microcomputer
DAQ	Integrated DAQ, external Ethernet or EtherCAT converter available	Integrated DAQ, external Ethernet or EtherCAT converter available	No external signal processing box	No external signal processing box	No external modular box required
Interfaces	USB, CAN, UART, Ethernet UDP/TCP, EtherCAT	USB, CAN, UART, Ethernet UDP/TCP, EtherCAT	UR, ROS, LINUX, WINDOWS, RS-485, RS-282	UR, ROS, LINUX, WINDOWS, RS-485	RS-422
Compatibility	Universal Robots, LINUX, Windows	Universal Robots, LINUX, Windows	Compatible with industrial robots ROS, LINUX	Made for UR 3 and UR 5	Made for UR 3 and UR 5
Measuring range	Fx, Fy: +/- 200 N Fz: 200 N (compression/tension)	Fx, Fy: +/- 200 N Fz: 1000 N/ 450 N (tension/compression)	Fx, Fy, Fz: +/- 150 N	Fx, Fy, Fz: +/- 300 N	Fx, Fy, Fz: 1000 N
	Tx,Ty: 10Nm Tz: 6.5 Nm	Tx,Ty: 10Nm Tz: 6.5 Nm	Tx,Ty,Tz: +/- 15 Nm	Tx, Ty, Tz: +/- 30 Nm	Tx, Ty, Tz: +/- 30 Nm

COMPARISON: SIGNAL SPECIFICATIONS 2.

Robotiq – Wacoh-Tech - OptoForce

	OptoForce HEX-70-XE-200N	OptoForce HEX-70-XE-1000N	Robotiq FT 150	Robotiq FT 300	Wacoh DynPick 1000N
Effective Resolution	Fx, Fy: ± 22.22 mN Fz: 133.33 mN (compression and tension)	Fx, Fy: ± 22.22 mN Fz: 125mN (tension/compression)	Fx, Fy, Fz: 0. 2 N	No data	No data
	Tx, Ty: ± 1 mNm Tz: ± 0.65 mNm	Tx, Ty: ± 1 mNm Tz: ± 0.65 mNm	Tx, Ty, Tz: 0.02 Nm	No data	No data
Creep/Dift	Short term creep: ~4% (<5mins) Long term creep: <1% (>5mins)	Short term creep: ~4% (<5mins) Long term creep: <1% (>5mins)	0.3 N over days	No data	No data
Data Sample Rate	Up to 1 kHz	Up to 1 kHz	100 Hz	100 Hz	No data
Temperature Compensation	-10°C – 40 ° C	-10°C – 40 ° C	15 °C-35°C	15 °C-35°C	No data

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COMPARISON: MECHANICAL SPECIFICATIONS

Robotiq – Wacoh-Tech - OptoForce

	OptoForce HEX-70-XE-200N	OptoForce HEX-70-XE-1000N	Robotiq FT 150	Robotiq FT 300	Wacoh DynPick 1000N
Dimensions (Height x Diameter)	35 mm x 70 mm	35 mm x 70 mm	37.5 mm x 120 mm	37.5 mm x 75 mm	40 mm x 90mm
Weight (Sensor only)	200 g (with built in adapter plates)	200 g (with built in adapter plates)	650 g	300 g	580 g
IP Rating	IP 67 (dust and waterproof)	IP 67 (dust and waterproof)	IP 54	No data	IP 65
Mechanical overload	Up to 200%, without permanent damage	Up to 200%, without permanent damage	5x max measurement	500%, exceeding this value, will permanently damage the sensor	No data
Power requirement	DC input range 7-48 V 0.8 W	DC input range 7-48 V 0.8 W	6-28 VDC 2 W	4.5-28 VDC 2 W	200 mA or less

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COMPARISON OVERVIEW

The OptoForce HEX-70-XE-200N/HEX-70-XE-1000N force/torque sensors, compared to their Wacoh-Tech, and Robotiq force/torque sensor counterparts, are a more advantageous choice regarding the following:

The Optoforce HEX-70-XE force/torque sensors have a wider range of measurement, while maintaining the same high precision.

The OptoForce sensors have morea vailable interfaces.

Based on the information above, taken from the manufacturer's website, the OptoForce sensor's resolution is better, with higher sampling rates, and better temperature compensation.

The OptoForce sensors, are not only smaller and lighter, but they're also IP 67 rated.

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REFERENCES

Optodforce: www.optoforce.com

Robotiq:

FT 150: http://robotiq.com/wp-content/uploads/2014/09/Robotiq-Force-Torque-Sensor-FT-150-Specifications.pdf

FT 300: http://robotiq.com/wp-content/uploads/2016/01/specsheet-FT300-Final-web.pdf

Wacoh:

Dynpick 1000N: http://www.wacoh-tech.com/en/products/dynpick/100n.html

November, 2016
Budapest

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www.optoforce.com