

The FT-300 sensor is not a precise tool. It is a **repeatable tool that should be used to give the sense of touch to the robot and not to weigh objects precisely.**

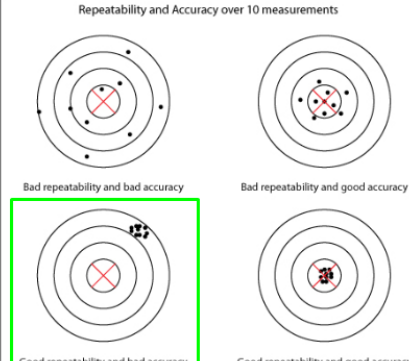
The signal noise* is the limiting factor for the sensor's precision. For the FT-300, the signal noise defined in the signal specifications is the standard deviation of each data (Fx, Fy, Fz, Mx, My, Mz) over 1 second. In order to use that signal noise information, three times the standard deviation given must be used. According to the normal distribution, three times the standard deviation will cover almost all values possible (99.7%).

*Signal noise is the standard deviation of the signal measured over a period of one (1) second.

Our sensor is a Repeatability tool. This means that the accuracy (especially at lower forces) can be off, but the "bad measurement" will always be the same. Therefore, the accuracy can simply be compensated by taking the force wanted and compensating with the force measured. (See green square below)

In the case of application, it is normal that the measurement is off after a long period. This is why we always recommend a "zero sensor" to be applied before each measurement. The measured value will then be in reference to the zero sensor function.



	<p>Also, it should be noted that for most applications, sensitivity and repeatability is more important than accuracy.</p>
<p>What is the difference between accuracy and repeatability?</p>	<p>Repeatability and Accuracy over 10 measurements</p> 

Also, it is normal for the sensor to see some form of "cross-talk" between the different forces and torque. This is related to the way the sensor is designed and working.

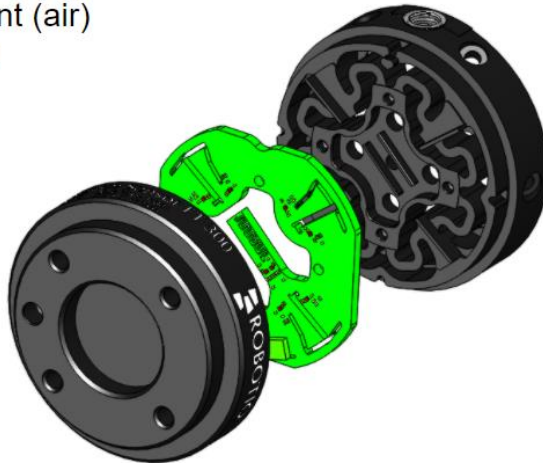
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How it Works

Capacitance between two parallel plates :

- Dielectric constant (air)
- Electric constant
- Area
- Distance

$$C = \epsilon_r \epsilon_0 \frac{A}{d}$$



One of the advantages of such a design is that the sensor is very stiff. However, when a force is applied, the whole sensor is "moving" and forces can be detected in other axes as well.

We compensate for this and evaluate the force applied in every direction, but it is very difficult to evaluate accurately the forces for all axis at the same time.

This behavior will have minimal effect in most applications unless you are looking to get a precise measurement of forces and torque overall axis at the same time, for which the sensor isn't recommended.

Again, the sensor is not a highly accurate device, but it is highly repeatable. Depending on your application, you can do your own "calibration" for a specific axis/force range by comparing it to a calibrated measurement machine and the result will be very consistent.

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