

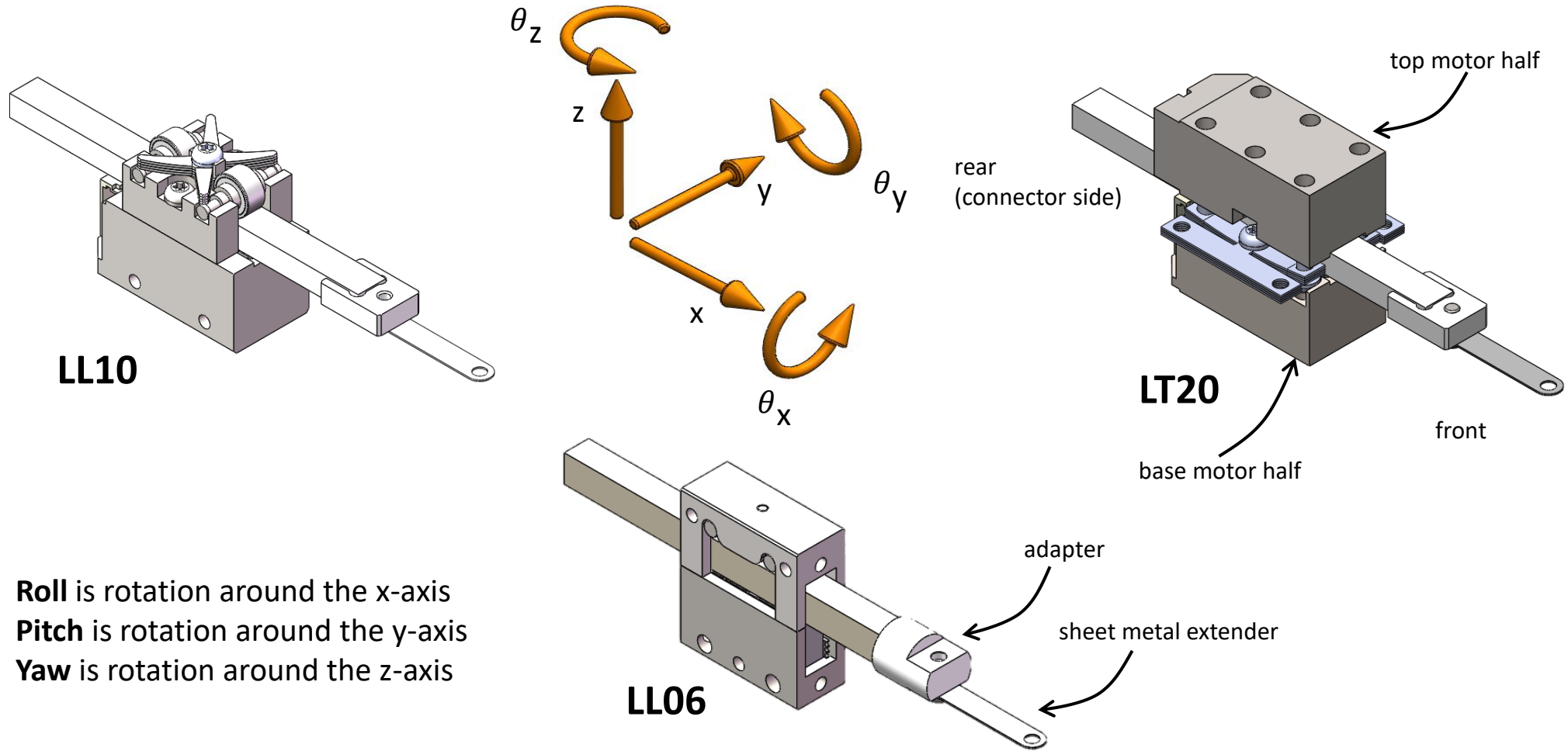
Mounting tolerance guidelines for PiezoLEGS® LT20, LL10 and LL06

This document aims to serve as a guide for mounting of PiezoLEGS® linear motors, to reach good performance and lifetime.

General values of build in tolerances is given, and the values can serve as a guide when designing and evaluating a connection between motor and an object to be moved. The document also includes definitions and explanations on how to interpret given tolerance values.

Definitions & Motor coordinate system

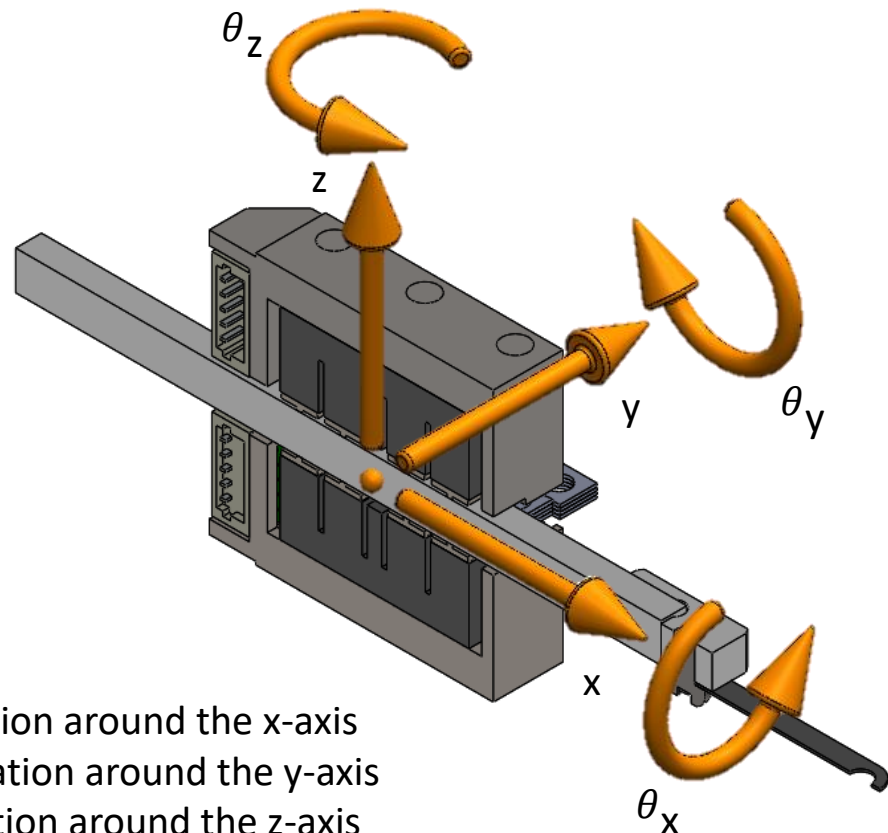
The coordinate system for a PiezoLEGS[®] linear motor is defined with aid of the figures below



Roll is rotation around the x-axis
Pitch is rotation around the y-axis
Yaw is rotation around the z-axis

Center of motor

All values on torque tolerances on the motor are defined from the center of the motor. The cross-section of a LT 20 motor with an inserted coordinate system show the position of the motor center. The xy-plane origo is the centre of the piezo drive elements.



Roll is rotation around the x-axis
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Yaw is rotation around the z-axis

Maximum applied torque

The maximum allowed torques on the drive rod. These values can be used as a guide when designing an adaptor for connection between motor and an object to be moved.

LL10/LL06		LT20	
Roll	±15 Nmm	Roll	±30 Nmm
Pitch	±15 Nmm	Pitch	±30 Nmm

table 1

Definition of tolerances

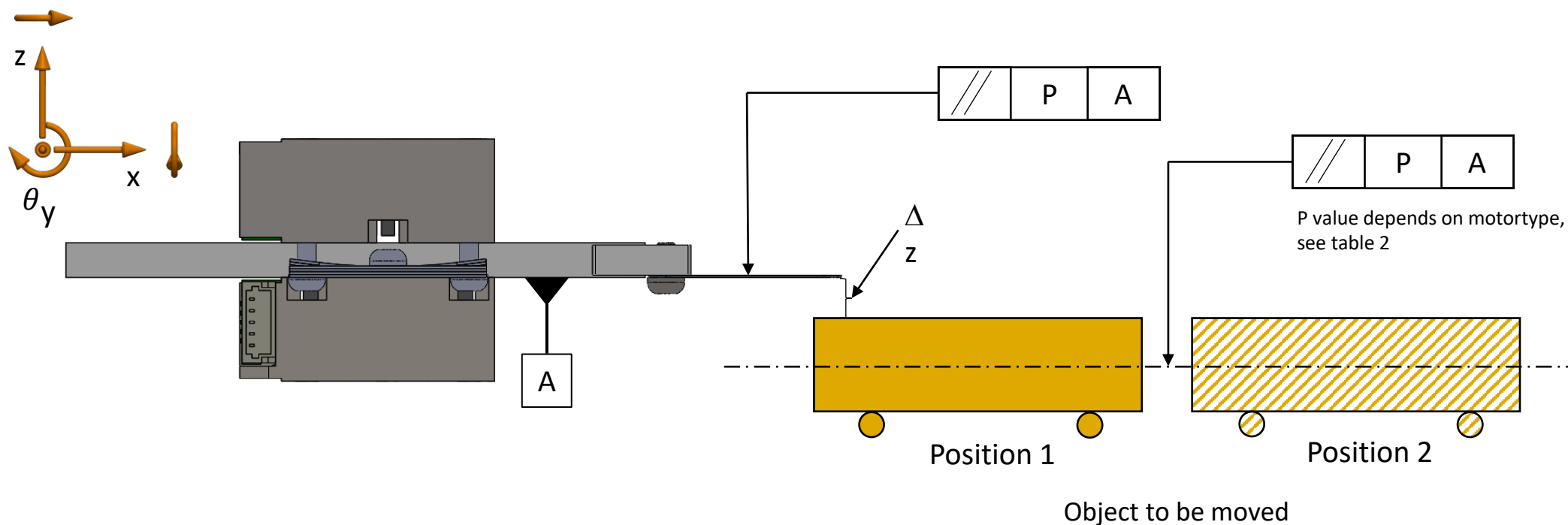
The reference surface A is the drive rod surface. This surface is the most accurate surface in the motion system and has a flatness within $0.3 \mu\text{m}$ per 15mm length.

Height tolerance, Δz , is the distance between the drive rod surface A and the object to be moved.

Parallelism is the maximum deviation in distance the drive rod is allowed to have relative the object to be moved over a full stroke.

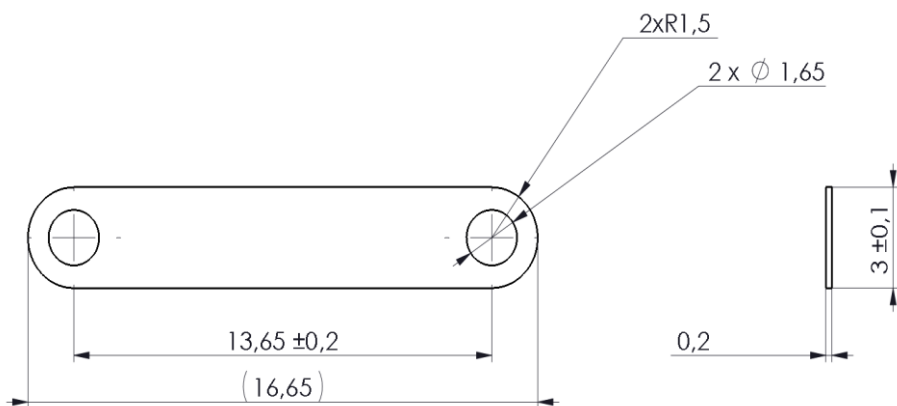
Roll is rotation around the x-axis.

Pitch is rotation around the y-axis.



Mounting with Adapter & Sheet metal extender

The standard sheet metal extender is an aid for mounting the motor to an object to be moved, while giving some transverse flexibility to minimise the risk of high pitch-induced torque.



Material: Stainless steel, $R_m > 1300 \text{ MPa}$ respectively
Copper beryllium (Non magnetic)

Mounting tolerances, dimensional.

LL10/LL06

LT 20

P	0.1 mm	P	0.1 mm
Δz	$\pm 0.05 \text{ mm}$	Δz	$\pm 0.05 \text{ mm}$
Roll	$\pm 5 \text{ mrad}$	Roll	$\pm 10 \text{ mrad}$
Pitch	$\pm 1 \text{ mrad}$	Pitch	$\pm 2 \text{ mrad}$

Table 2

The motor is not sensitive to deviation in the y-direction. It is however recommended that Δy is kept at the same level as Δz , i.e. $\pm 0.05 \text{ mm}$.

Yaw is not a critical issue for the Piezo-drive function, but should be kept as low as possible to ensure that all motion is transferred in the x-direction.