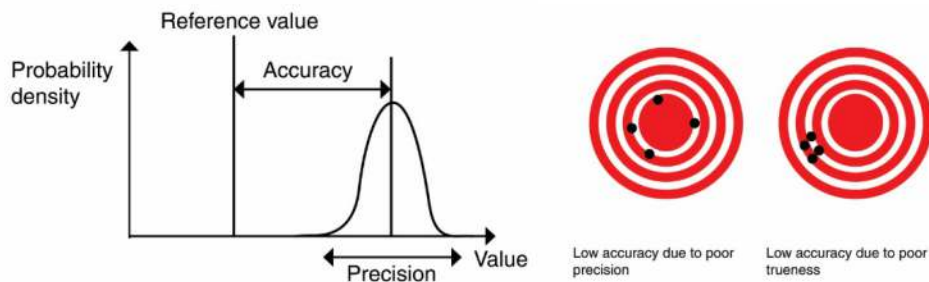
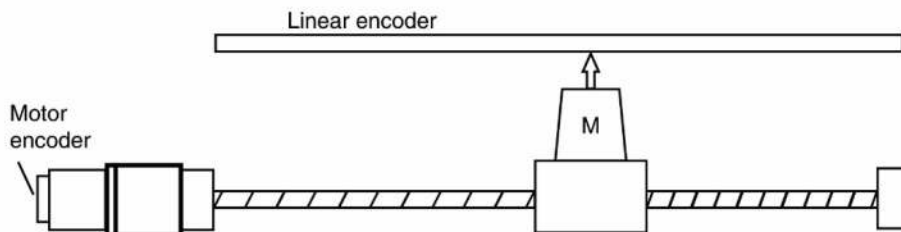


Accuracy and precision:

Accuracy refers to closeness of the measurements to a specific value, while **precision** refers to the closeness of the measurements to each other. Also called repeatability.



Let's consider this example:



a servo motor is connected to a lead screw through a planetary gear. The load is connected to a secondary linear encoder.

Motor encoder resolution : 10,000 PPR

Linear encoder resolution : 1µm (one micron)

Gear ratio: 1:10

Gear backlash: 10 arc min

Lead screw pitch: 10mm

Lead screw backlash: 1µm

Let's calculate the **accuracy** of the system:

If we assume a rigid system (no backlash) then the minimal possible step will be:
 $[10\text{mm (pitch)}] / [10,000 \text{ revolution (moto encoder)}] / [10 \text{ (gear)}] =$
 $0.000001\text{m} = 0.1\mu\text{m}.$

Since our linear encoder is 1µm, our position loop will give us a 1µm resolution .

* assuming ideal encoder