Starting from a very low value, increase the positioner's voltage in the daisy GUI software until it starts moving (either check visually or by watching the GUI's sensor readout) for both up and down direction separately. Use the same frequency for all repetitions, e.g. 1000 Hz.

$Voltage_{Up} < Voltage_{Down}$	⇨	add weight to the system and repeat
$Voltage_{Up} > Voltage_{Down}$	⇨	remove weight from the system and repeat (if this is not possible mount a stronger spring)
$Voltage_{Up} = Voltage_{Down}$	⇨	Within a tolerance of ±1V the system is in balance and ready to use

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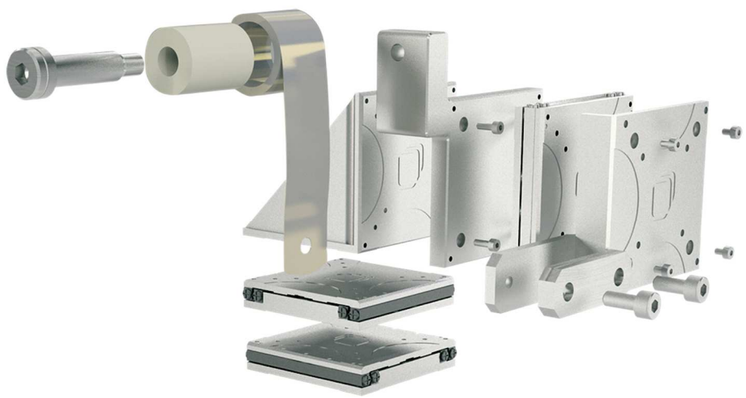
attoMOTION

Piezo-based Nano Drives

User Manual – ECS/Lift



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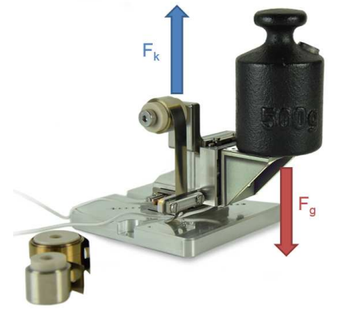
Version: 1.0
Modified: September 16
Products: ECS3030/Lift
ECS5050/Lift
Environments: ambient: /RT vacuum: /HV, /UHV

IV. Adding trim weights

Constant force springs are available in different strengths and have a production related tolerance of ±20% of the specified force. In most cases the gravitational force F_g of the object or probe to lift will not exactly match the force F_k generated by the spring .
Therefore the spring should be chosen so that $F_k > F_g$ and it is necessary to trim the system's load to its equipped spring.



A way to measure the balance of those forces F_g and F_k is to have a look at the positioner's starting voltage:

The starting voltage is the lowest voltage at which the positioner is able to perform stable slip-stick-motion

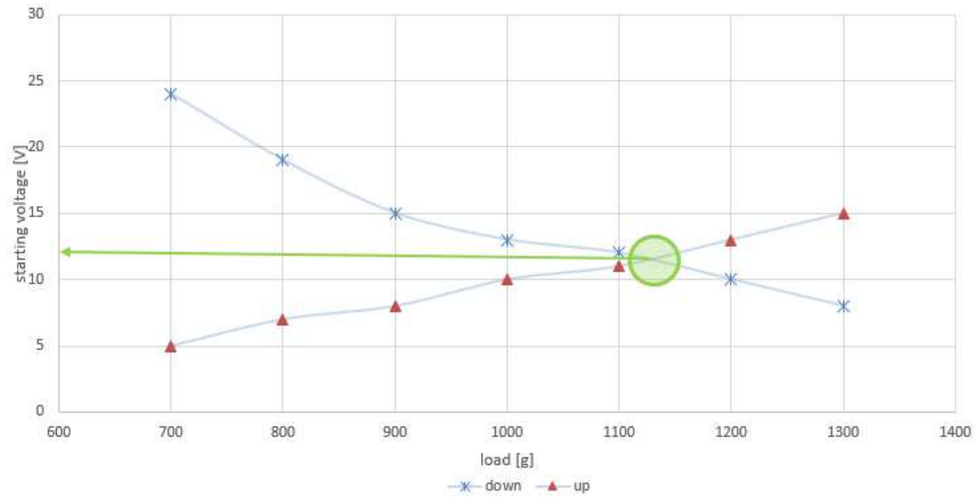
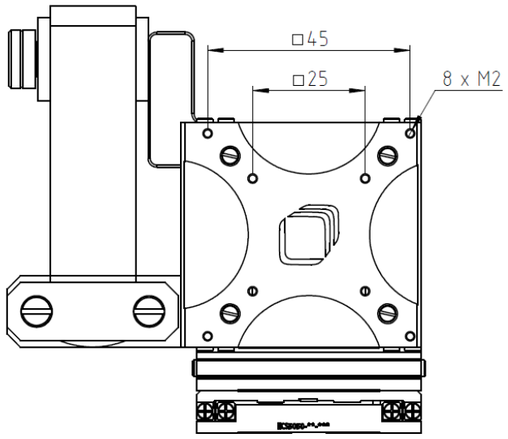


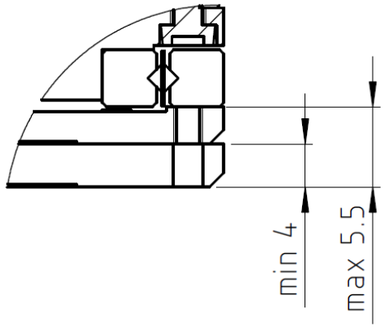
figure: starting voltage over added load on a 10.5 N spring setup

Note that the graph is only an example and values at which the system is in balance depend on many factors like type of positioner, relative humidity or

III. Mounting the load



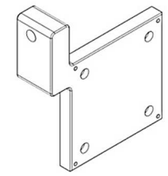
There are 8 threads M2 to mount either an adapter plate or the load directly. The threads are in two square drilling patterns 25mm and 45mm (15mm and 25mm for ECS3030).



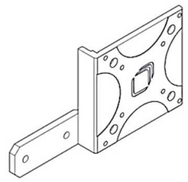
The minimal penetration depth for a mounting screws is 4mm, the maximum is 5.5mm

⚠ Do not exceed the maximum of 5.5mm as it can cause permanent damage to the positioner!

I. Scope of delivery



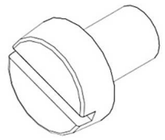
1x adapter L-bracket to spring



1x adapter ECS to spring

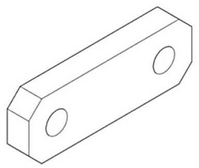
3x constant force spring pre-mounted on PEEK bushing:

	ECS3030/Lift	ECS5050/Lift
1x	5N	10.5N
1x	8.8N	17.9N
1x	14.7N	22N

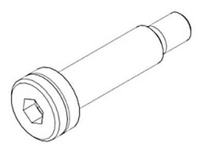


14x slotted head screw (ISO1207):

ECS3030/Lift	ECS5050/Lift
12x M2x3	
2x M3x8	2x M4x8

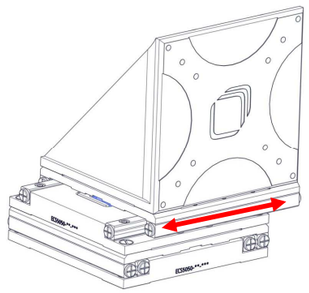


1x clamping piece



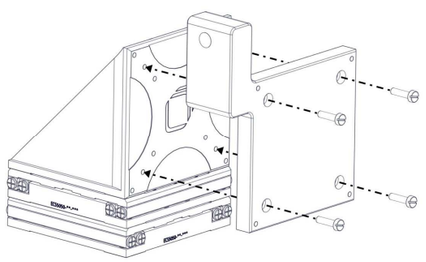
1x shoulder screw M4/M6

II. Assembly



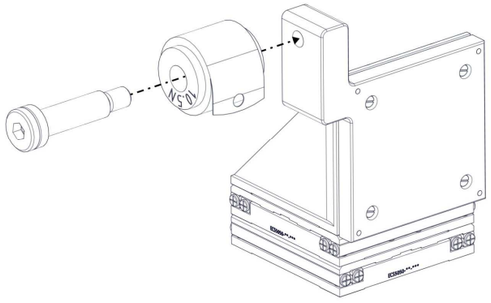
Start with 2 ECS positioners and an L-bracket EAP03 or EAP04 (EAP01 or EAP02 for ECS3030) mounted on top of each other.

Make sure the top positioner moves parallel to the L-bracket's vertical surface.



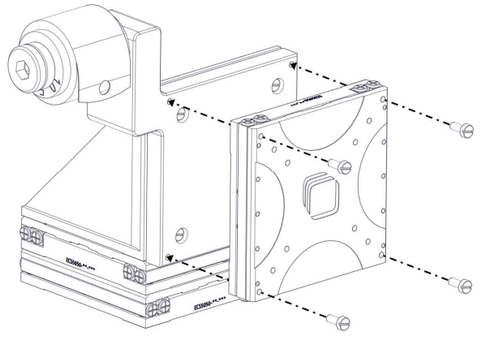
1x adapter L-bracket to spring

4x M2x3 slotted head screw



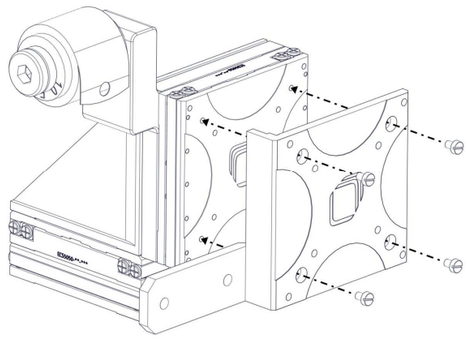
1x shoulder screw M6 (M4 for ECS3030)

1x spring kit



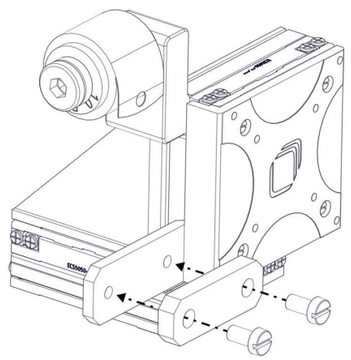
1x ECS Positioner

4x M2x3 slotted head screw



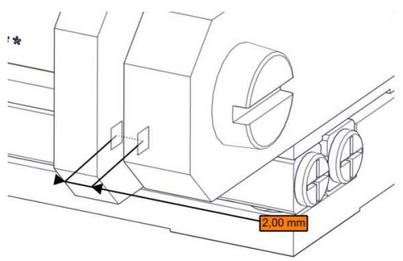
1x adapter ECS to spring

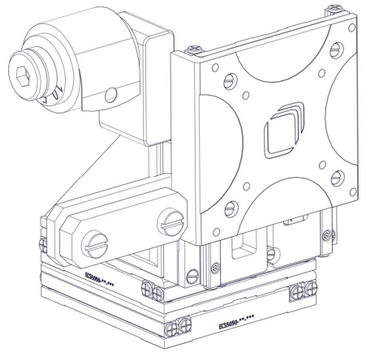
4x M2x3 slotted head screw



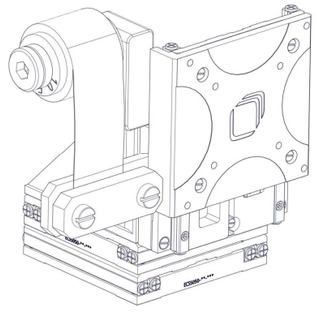
1x clamping piece

2x M4x8 (M3x8 for ECS3030/Lift) slotted head screw
Do not yet tighten the screws, but leave a gap of around 2mm:





Move up the z-positioner



Unroll the spring and place the loose end in the gap under the clamping piece. Keep holding the spring and the bushing with one hand while tightening the screws to fix the clamping piece with the other.