



A human machine interface with the **Elliptec Motor**

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Business development

human machine interfaces



joysticks



buttons



Mouses and trackballs



wheels



keyboards



knobs



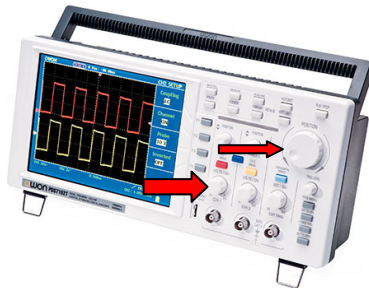
touchdisplays

human machine interfaces and markets

wheels and knobs



Industrial devices



Medical devices



IT-solutions

Different types of knobs

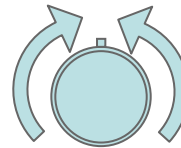
Knop with **endstop**:

- often for analog values
- inexpensive
- same position sam value
- often no raster



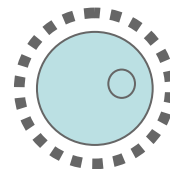
Knop with **centering**:

- Turn and hold to change values
- multi speed increment / decrement
- Shuttle dials



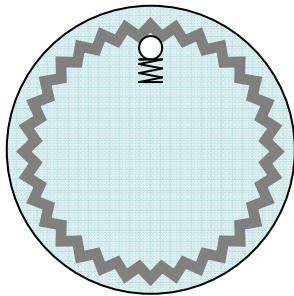
Endless wheel with **raster**

- multi parameters
- increment / decrement
- combination with button

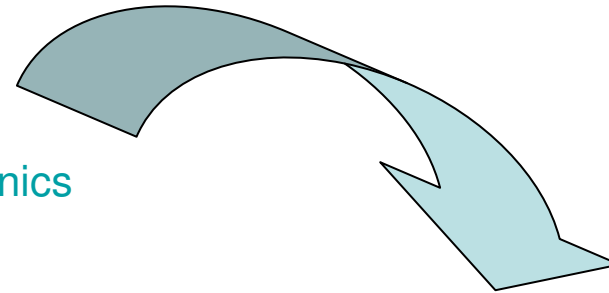


Endless wheels with raster

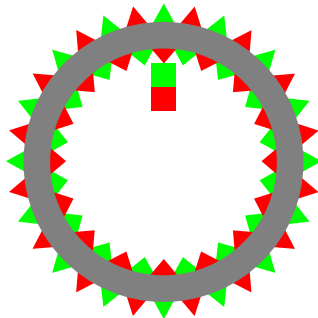
implementation of raster for haptic feedback



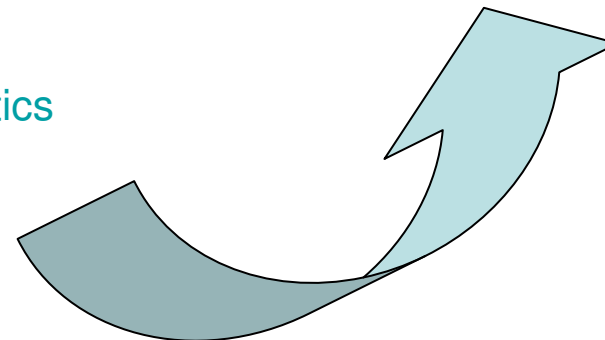
Raster done by **mechanics**
- mass products



fixed steps

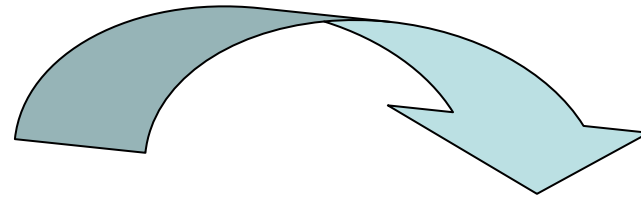


Raster done by **magnetics**
-Expensive solution

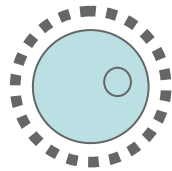




All types of knobs into the Elliptec modul

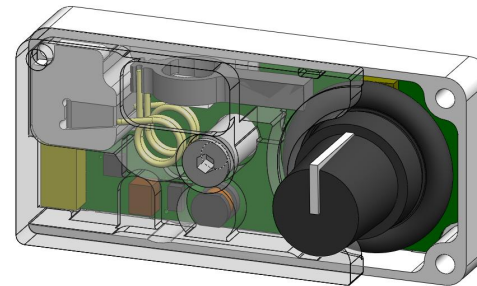
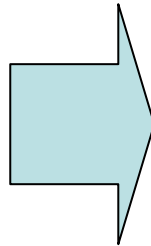


Endless wheel with raster



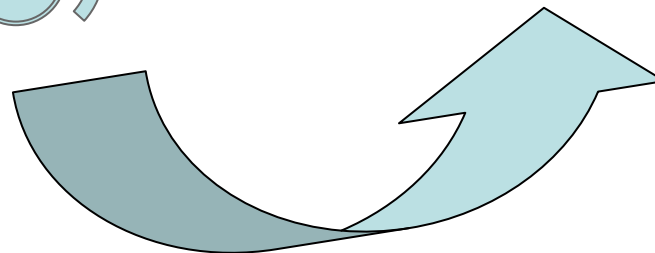
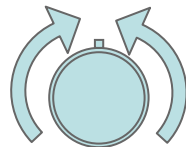
Use **positioning feedback system as input**

knob with **endstops**



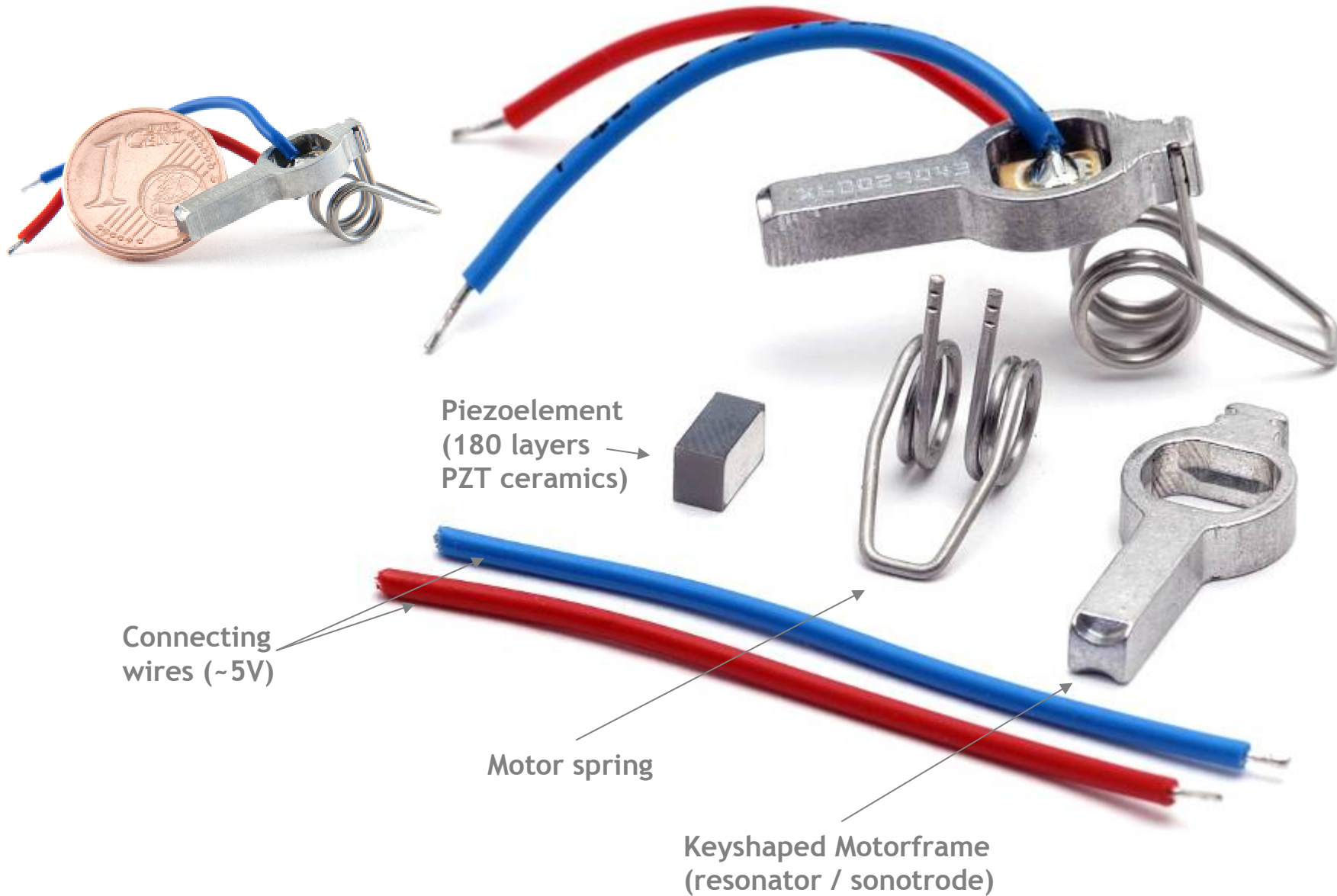
MR40S

knob with **centering**





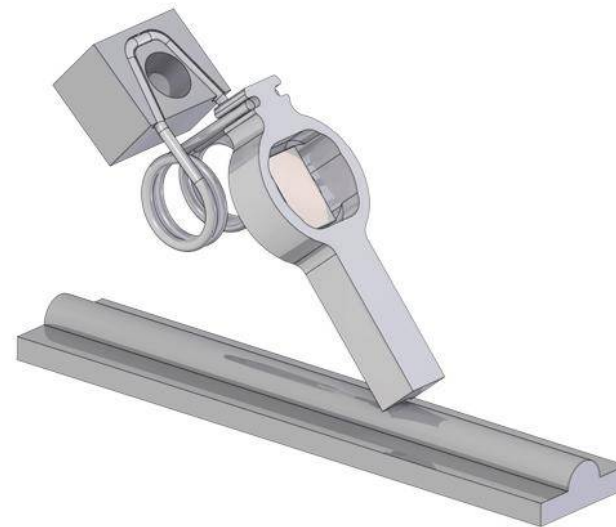
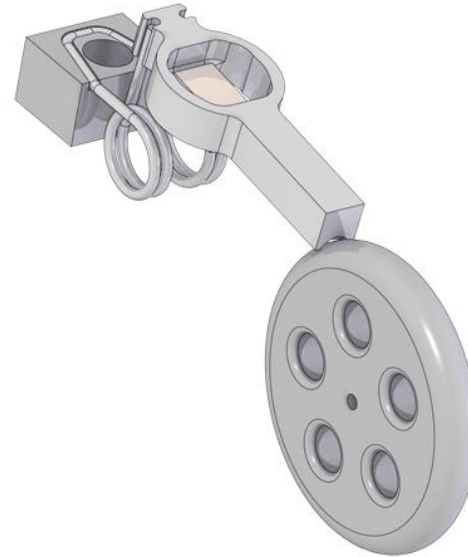
Elliptec Motor X15G - only 3 functional parts



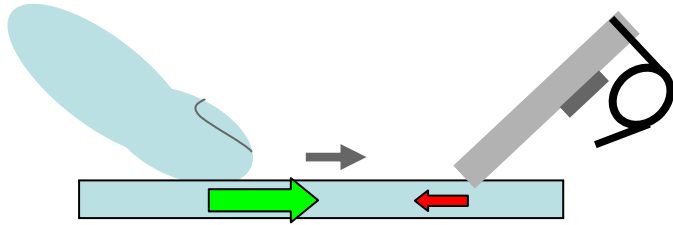


Elliptec Motor X15G - rough information

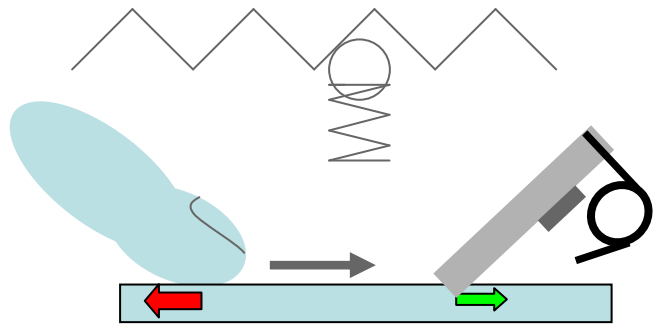
- e Linear or rotary driven elements possible
- e Two directions
- e Driving by friction on plastic parts
- e Force: ~ 0.2 N
- e Unpowered holding force ~ 0.8 N
- e Supply Voltage 5V
- e Mass product



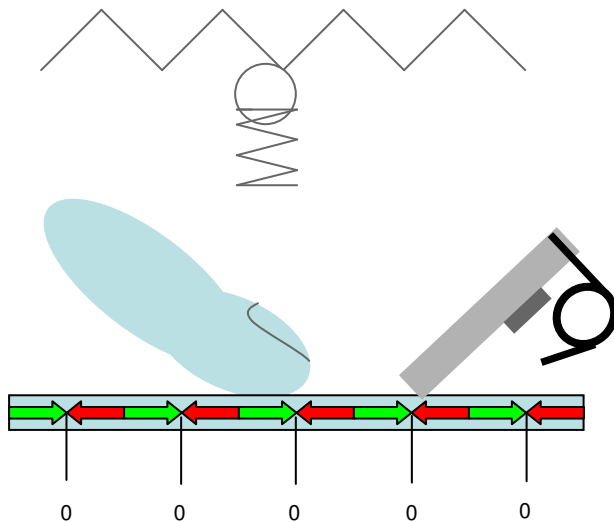
Idea: **human force** is stronger than **motor force**



Generate **sensible** force
(against finger pressure)

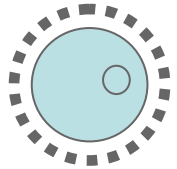


Change **direction** of force
(on each edge)

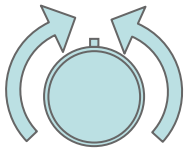
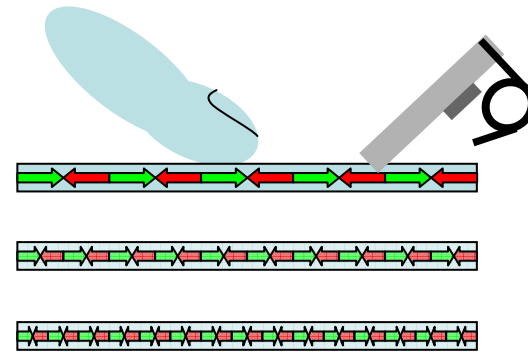


Build **pattern** with **changing**
direction of forces
(when let loose motor moves to next zero)

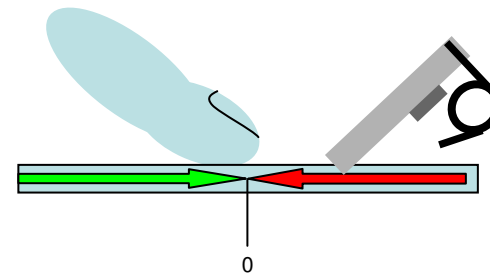
Different knob functions Elliptec motor



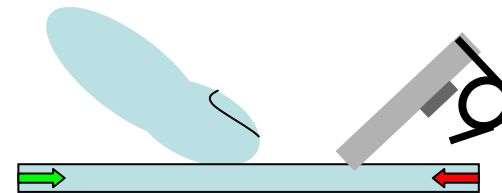
Endless knob with **variable** raster
(scaleable **pattern size**)



Jogdial / **centering** knob
(only one zero position)



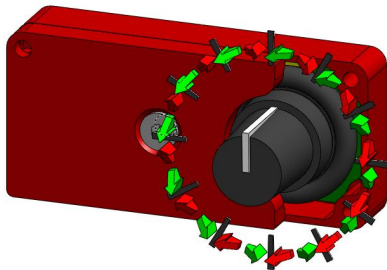
knob with sensible **endstops**



Machine Interface controll

Unit delivers **user input**:

- Quadrature A / B
- serial data format



SPEICHER		
Datensatz bearbeiten	[OK]	
GERÄTEPARA	MUX	KONFIG [F5]
Energiespar	Fehleranzeige	EIN
Trigger	Taktanzahl	8
Sendereinst	Taktnummer	4
Senderdam	Mux Verz	60 ns
Frequenzbe	Mux Verst	2.2 dB
Gleichrichtung	DOPPEL	
Impulsfolgefrequenz	0 %	
MULTIPLEXBETRIEB		
Multiplexbetrieb		KONFIG [F5]
Gleichricht.	Taktnummer	D-bearbeiten
Monitor 1	Monitor 2	

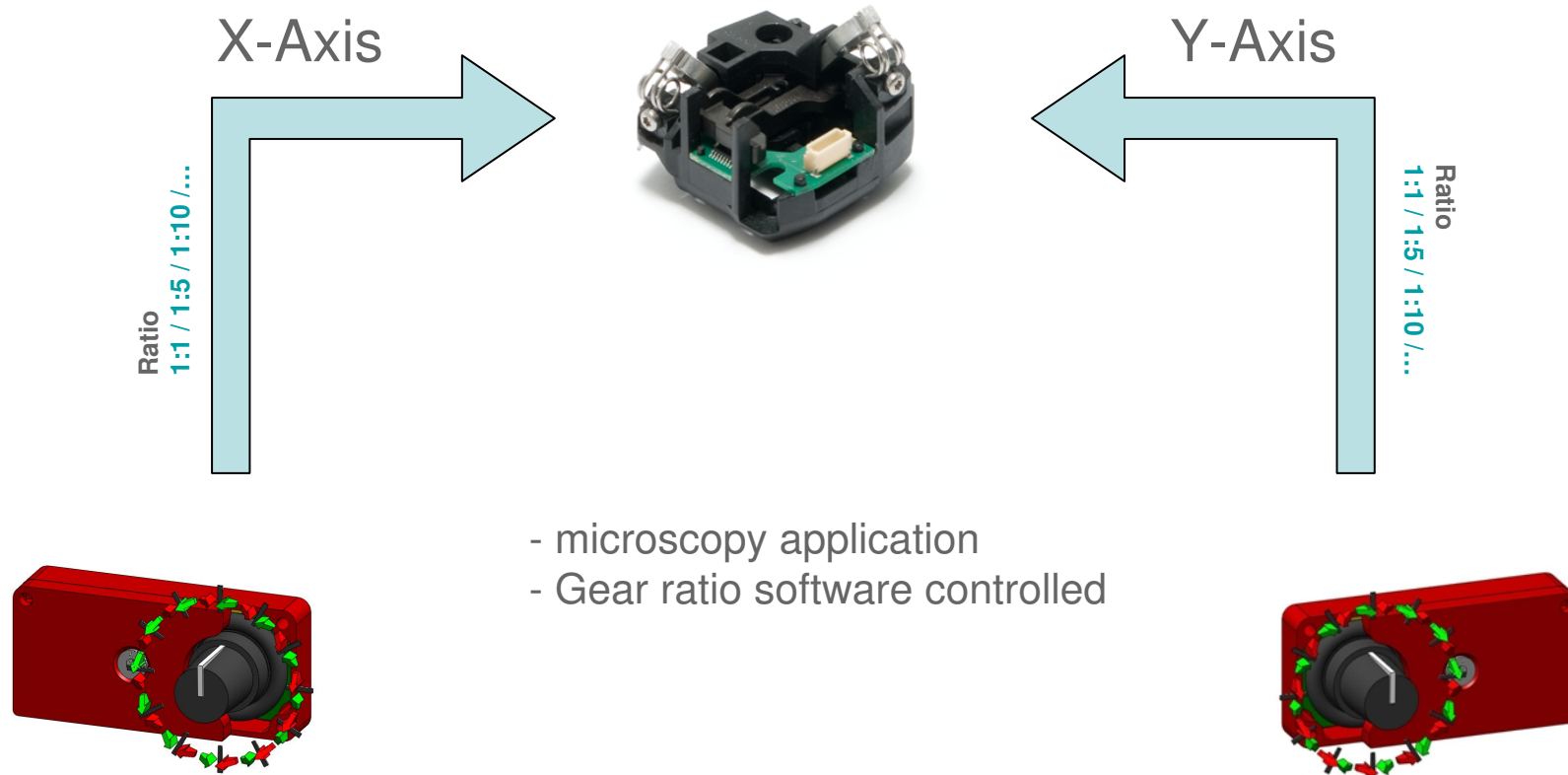
CPU or mainprogramm

Software controls input device:

- active force feedback
- I2C,UART,SPI,...
- mode (endless, end stop, jogdail)
- resolution of raster

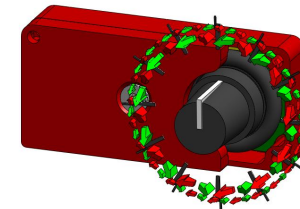
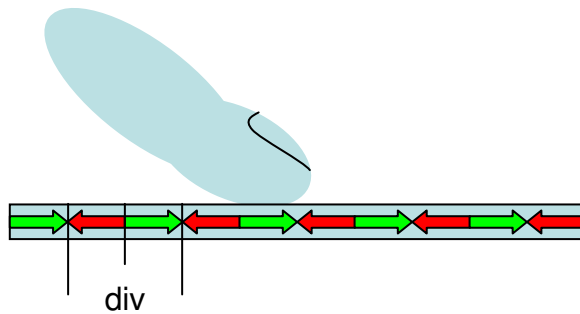
New ideas - with standard products

Control **XY**-Positioning with **2x** haptic knob

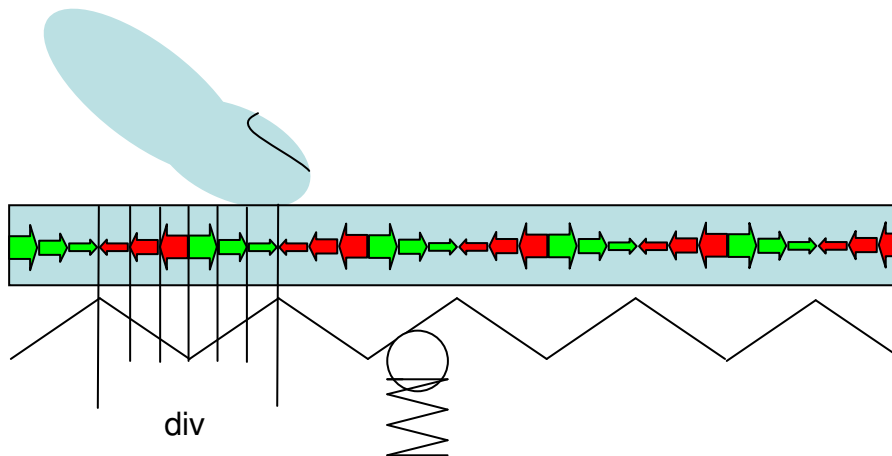


Result: New Elliptec Standard Products

Elliptecs functional model today

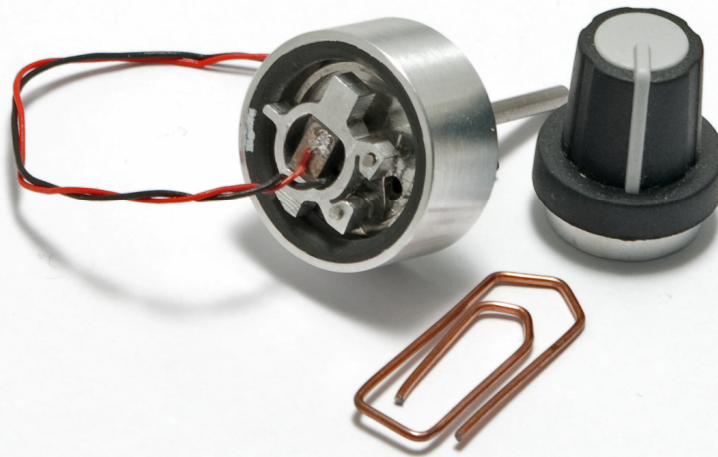


High definition feedback tomorrow?



New ideas - with new products

Customize your Interface



→Let's make it **smaller**

→Let's do **mass production**

→Let's make **your** machine **unique**



Elliptec AG: Who we are

- e Elliptec develops, produces and sells **low cost piezo-motors and -actuators**
- e Elliptec offers **engineering services and design-in support** for their products
- e Headquarters and production facility is in **Dortmund, Germany**

