



STIFF-FLOP soft manipulator

Modular soft manipulator with high dexterity and intrinsic safety. The manipulator is based on a modular approach and each module is 60 mm long and 14 mm in diameter. It is able to implement omnidirectional bending and elongation when pressurized (pressure range: 0 – 1.5 bar). The basic version of the manipulator is composed of two modules, completely based on elastomers (silicones) and some ABS parts for connection. On the tip, the system can lodge a micro camera, a gripper or an ablator (all tested)

Key Features

- Safe interaction with body parts or delicate objects
- Modular
- Contraction, elongation, omnidirectional bending
- Multipurpose platform

Possible Applications

- Endoscopic/Surgical robotics
- Controllable overtube structure for inserting and guiding flexible tools
- Soft robotic platform for testing control algorithms



Access information

Corresponding infrastructure	School of Advanced Studies Sant'Anna The BioRobotics Institute
Location	Viale Rinaldo Piaggio, 34 56025 Pontedera PI, Italy
Unit of access	Working day



Technical specifications

Modules can be quickly connected/disconnected for a one/two modules manipulator.

DoF	Infinite passive – 6 active (actuators)
Time response (pneumatic valves)	0.03 sec
Interface	USB
Power supply	220 V@ 50 Hz
Weight	9 g (per single module)
Operating pressure	0 – 1.5 bar (per single fluidic chamber)
Bending	Omnidirectional – max 90 deg
Elongation	50%

Additional information

<https://www.dropbox.com/s/c43uxr16xornzwo/Miniaturised%20STIFF-FLOP%20manipulator.wmv?dl=0>