

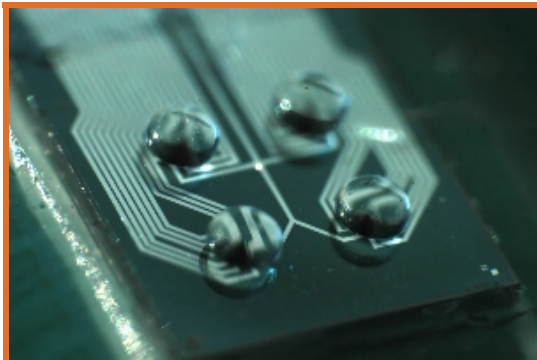
TactoPad 2×2 | Data Sheet

4 element three-axial force sensing array

Version 1.2.

General Description

TactoPad 2×2 is a general, small, contact-force mapping system, consisting of four (2×2) three-axial taxels in an array. The three-axial signals of the four taxels provide the possibility for basic 6 DOF, dynamic, spatial-temporal tactile measurements on arbitrary objects. The small outlook (3×3 mm active area, 4×12×24 mm total size) makes this device ideal for arbitrary robot-hand mounted applications aimed at precise object handling.



Product Highlights

- three-axial force sensing in an array
- highly linear characteristics
- high sensitivity
- small active area
- portable, compact size
- robust design
- easy connection to PC through read-out electronics
- easy-to-use software for acquiring, visualizing and storing data

Applications

- robotic grasping tasks
- enhanced object handling



- pre-slip detection
- friction estimation
- texture classification

Technical Specifications

GENERAL	
technology	piezoresistive
measured quantity	three-axial force
number of taxels*	4 (2x2)
PCB type	rigid
DIMENSIONS	
bare taxel size	0.3x0.3 mm
taxel spacing	1.5 mm
size of total active area	3x3 mm
size of device	4x12x24 mm
SENSOR-ELEMENT CHARACTERISTICS**	
bare sensor load range	0–3 mN
bare sensor sensitivity	4–6 mV/mN/V
full load range with cover	<i>normal</i> : ±0.64 N; <i>shear</i> : ±0.25 N (comparable to the range of light dexterous manipulation)
normal sensitivity	5 mN / bit
shear sensitivity	2 mN / bit
nonlinearity	±1%
accuracy	±5%
repeatability	±3%
long term instability under large load	approx. 1 bit lapse / min.
temperature dependence of offset	approx. 1 bit / °C
COVER	
cover type	elastic (Elastosil® RT–601)
Shore-A hardness	45
equivalent Young-modulus	2.4 MPa
cover thickness	0.5 mm (could be modified if needed)
cover surface	bumpy
receptive field size of taxels with elastic cover	0.8x0.8 mm
cross-sensitivity of neighboring taxels, resulting from the receptive field properties of the cover	<i>shear x</i> : x neighbor 20% <i>shear y</i> : y neighbor 20% <i>normal</i> : x and y neighbors 30%
viscoelasticity of the cover	<i>normal</i> : exp. decay in <2 min.

* *tactile pixel* or *tactile element*

** parameters are measured on 8 bit output and maximal sensitivity (maximal gain: 100) settings



<i>shear: none</i>	
OUTPUT	
read-out electronics	Tactologic MasterBoard
output type	3-channel tactile image of 2x2 taxels
output resolution	8 or 16 bit with adjustable gain (0–100)
output noise	2%
output scan rate	0–100 FPS
POWER	
voltage supply	5V DC
current consumption	16 ± 5 mA sensor, 0-20 mA MUX
maximum power consumption	200 mW
SYSTEM LEVEL FEATURES	
connector type	serial or USB
read-out software	TactoSofT 2.0.
operating system	Windows XP
Minimal PC requirements	800 MHz processor, 40 MB hard disk space, 256 MB memory
OTHER	
warm-up time	2 minutes
operating temperature range	5 °C to 40 °C

To Our Valued Costumers

It is our intention to provide our valued customers with the best documentation possible to ensure successful use of your **Tactologic** tactile array. To this end, we will continue to improve our publications to better suit your needs. Our publications will be refined and enhanced as new volumes and updates are introduced.

If you have any questions or comments regarding this publication, please contact our company at info@tactologic.com. We welcome and appreciate your feedback!

Tactologic engineers are constantly working to improve the quality of our products. Specifications are therefore subject to change without notice. To obtain the most up-to-date version of this data sheet, please visit our website at <http://www.tactologic.com>. You can determine the version of this document from the heading on the first page.

Thank you for choosing **Tactologic** products!