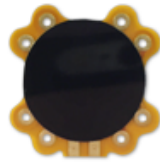


FSR Sensor Data Sheet

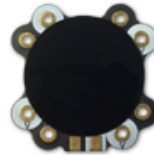
Product List



RA18
18mm x 30mm



RA18-DIY
18mm x 18mm



RA18P-DIY
18mm x 18mm



QA6P
6mm x 11mm



RA9P
9mm x 12mm



RA12P
12mm x 14.15mm



RA30P
30mm x 32mm



RA3040P
46mm x 33mm

Introduction

This document details the specifications of the 6 types of 1-channel FSR sensors by Marveldex. Each sensor type has its own size and shape and is made of either FPC or PCB. Each sensor may have a distinguishing appearance but they all have one common qualitative attribute to adjust the resistance in inverse proportion of the force.

When building a typical ADC measurement circuit using this attribute, one may obtain a voltage output in proportion to the force. This can be applied to create touch solutions or industrial solutions and is also suitable for developing flatness measuring instruments, compression/decompression solutions, or items that react to certain weights. This attribute lacks linearity, and therefore, may not be adequate for quantitative products such as scales.

How to Use

In order to obtain the same output as illustrated in the sensor output graphs of this document, it is important to replicate the testing environment as much as possible - i.e.

the breadth and material of actuator and error range of direction below 5 μ m. Even though the instrumental conditions are the same, the output values may deviate due to temperature, humidity and the production lot. Such deviation may be controlled and corrected by installing a potentiometer on the point corresponding to Rc on the example circuit diagram of this document.

Our sensors are composed of prime sensing zone, dead zone and intermediate zone. It is advisable to apply force on the prime sensing zone.

There are two ways to connect the sensor to the drive board : soldering and knotting. The holes on the sensor connector are for wire knotting to facilitate assembly. Sensor terminals marked 'V' or 'A' are all internally connected. You just have to choose a terminal that enables the most convenient wire connection.

Part Number Description

R A 18 P - DIY

- DIY : Sensors have internally connected holes for wire knots
- Material of circuit part. P: PCB, None : FPC
- Size. Pi or length of side. (exception : 3040 is 30mm and 40mm)
- Version (A, B, C, ...)
- R : Round, Q : Quadrange

Sensor Characteristics

Typical Performance

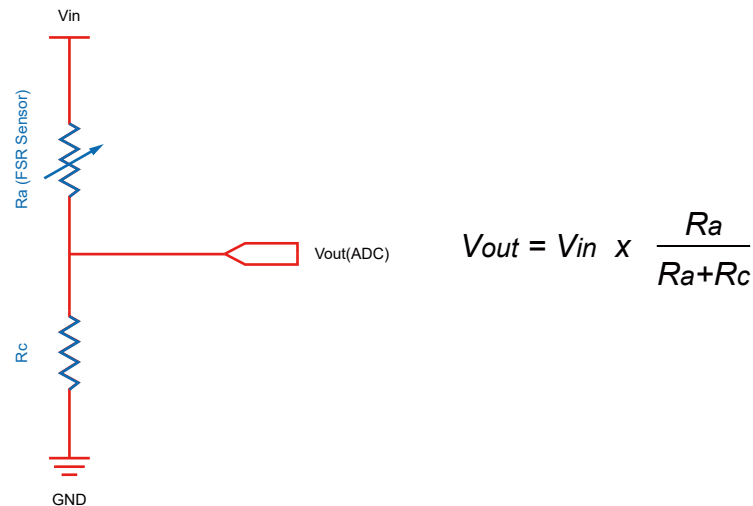
Unit	Description
Response time	< 10 μ sec
Operating temp	-20 $^{\circ}$ C ~ 60 $^{\circ}$ C
Storage temp	-30 $^{\circ}$ C ~ 60 $^{\circ}$ C
Operating Humidity	$\leq$ 90%
Durability	2,000,000 stroke (100g) or over 500,000 stroke (150g)
Drift	< 5% per logarithmic time scale by constant load of 100g
Electric crosstalk (noise)	None
Power consumption	Consumes only while operating. Typically around 5mA, and maximum 20mA.
Resistance output range	∞ ~ 200 Ω
Sensing range	5g ~ 4kg

Tolerance

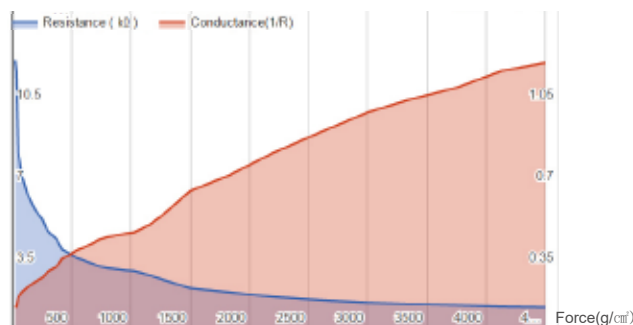
Unit	Description
Mechanical tolerance	$\leq$ 50 μ m
Temperature influence	$\leq$ 10%
Humidity influence	$\leq$ 20%
Output tolerance	Max 20%

Application Information

To view the output values, you can either measure the resistance using a multimeter or build an ADC circuit and measure the proportional value (conductance) to the inverse value of resistance. Building a simple circuit as shown below, you can obtain output values using the equation on the right. In the circuit diagram, R_a indicates FSR sensor resistance and R_c indicates reference pull-down resistance.



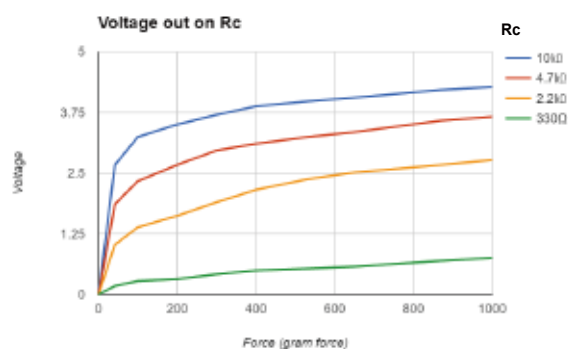
The output values may display a similar pattern as shown in the graph below. The color blue indicates resistance of the sensor and the red indicates the inverse number of resistance (conductance). The ADC output values from the circuit exhibit a similar pattern as the blue graph.



Looking at the conductance graph, it is evident that the slope value is high below 50g and low above 500g.

Adjusting the R_c resistance value will alter the graph as shown below.

If R_c value is increased, the resolution of lower weight is increased, and if R_c value is decreased, the resolution of higher weight is increased.

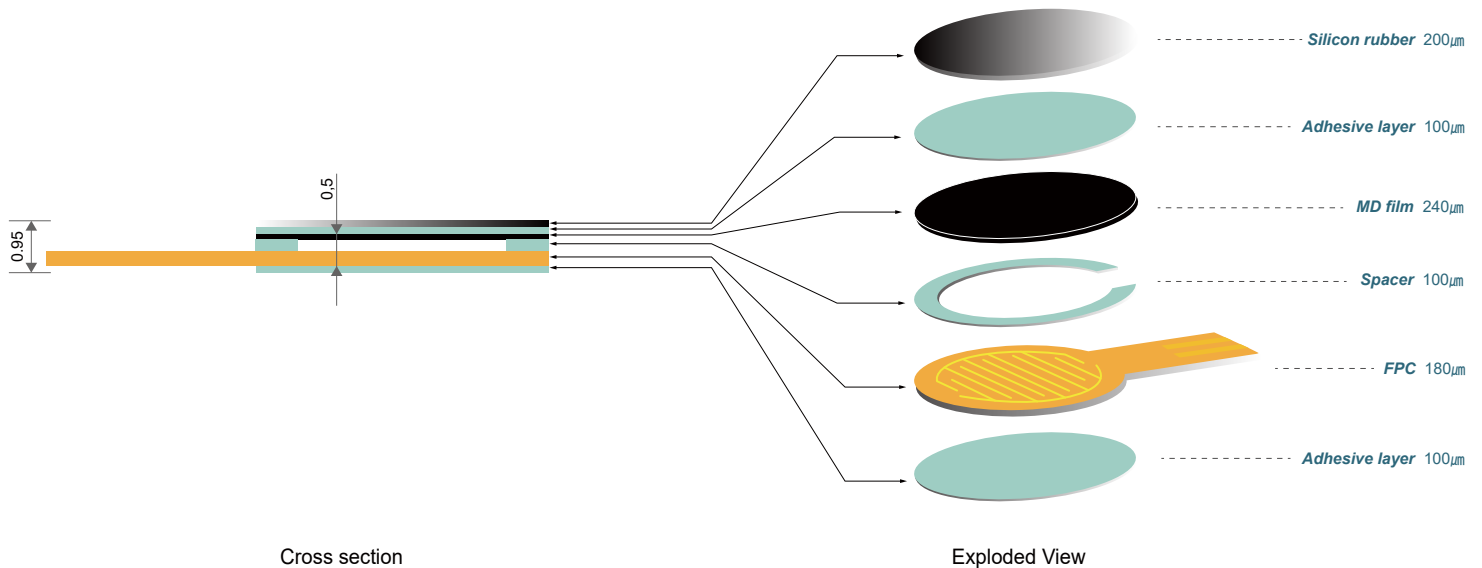
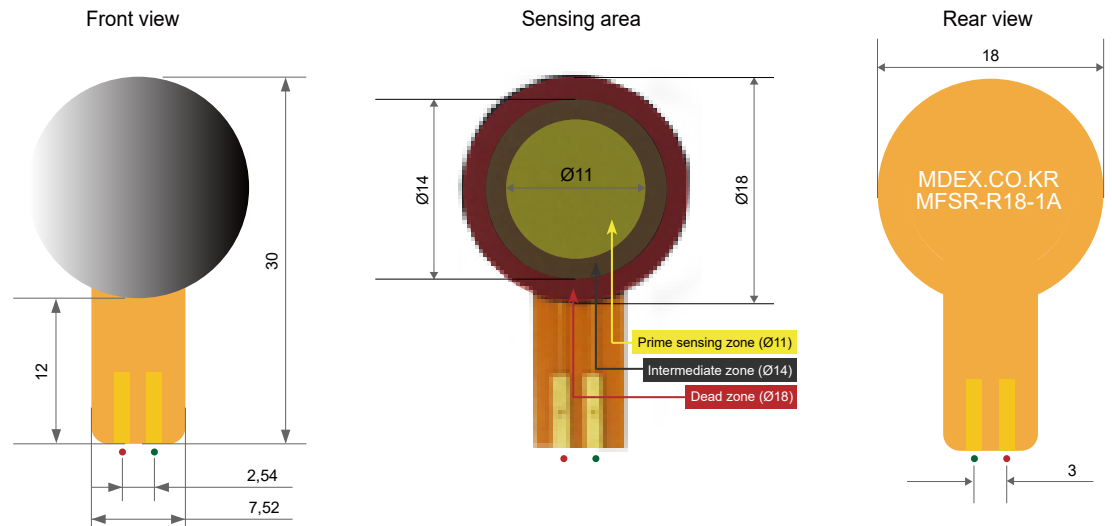


Model RA18

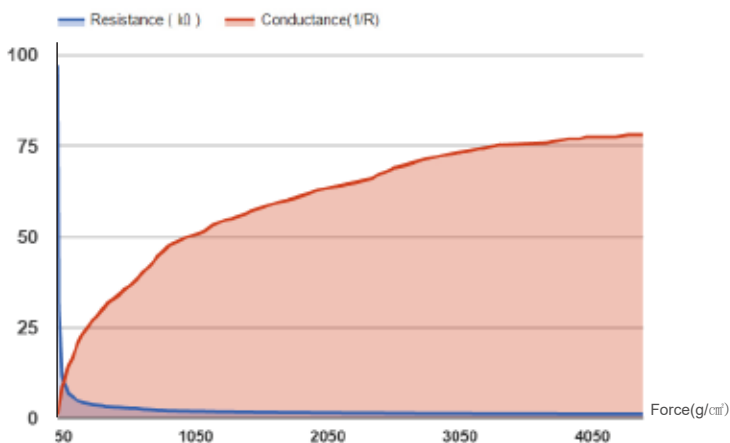
Model RA18

Unit	Description
Length	30mm
Width	18mm
Thickness	0.95mm
Sensing area	11mm
Sensing range	5gf ~ 4Kgf
Pin	Vin ● ADC out ●
Actuator layer	Silicon rubber

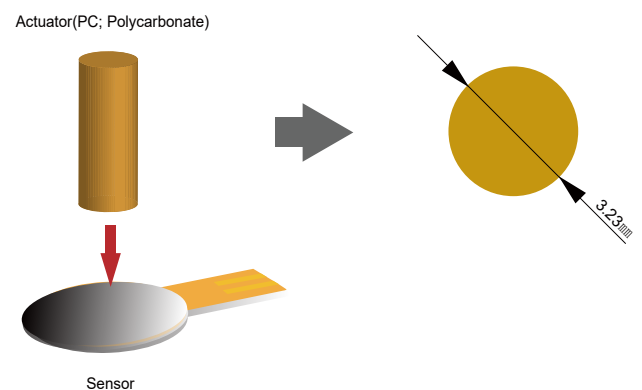
Sensor Mechanical Data(Scale : mm)



Graph) Force to Resistance and Conductance



Actuator



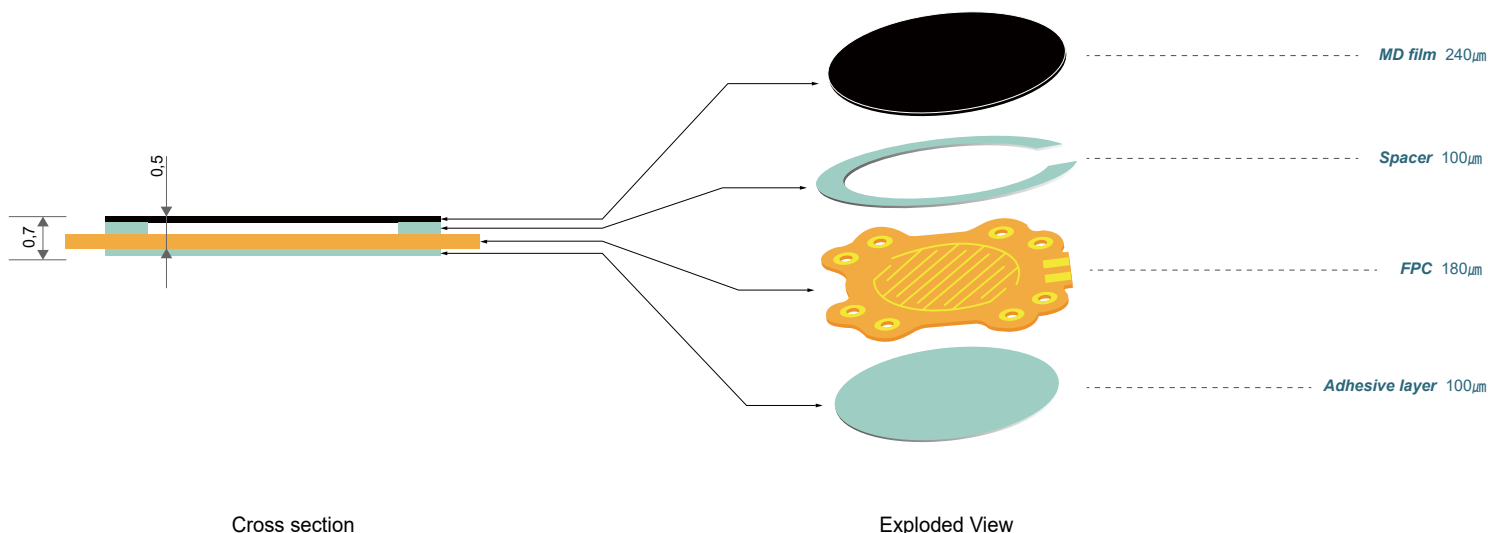
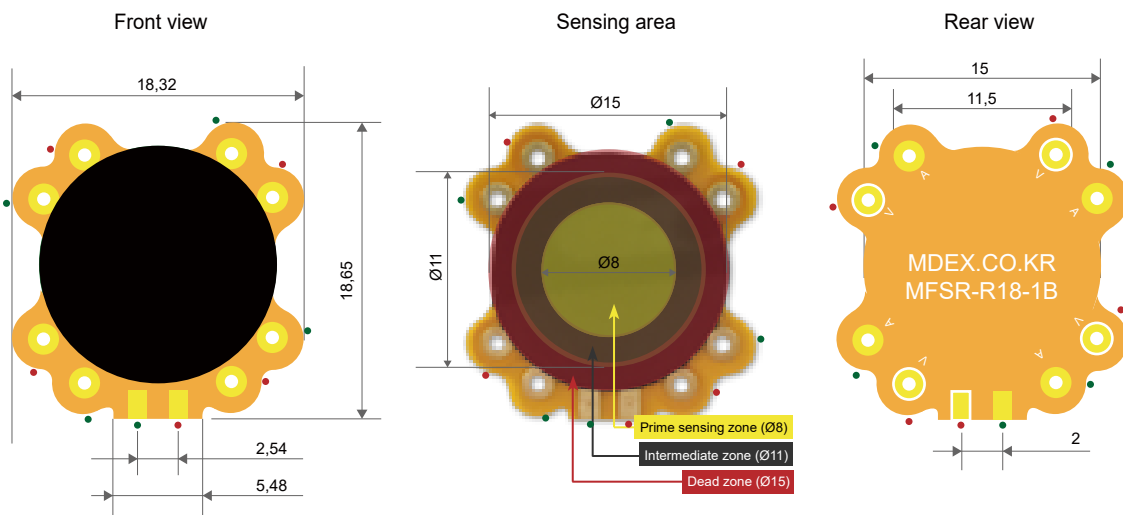
Sensing range is 5gf ~ 4Kgf while actuator is size of 3,23mm

Model RA18-DIY

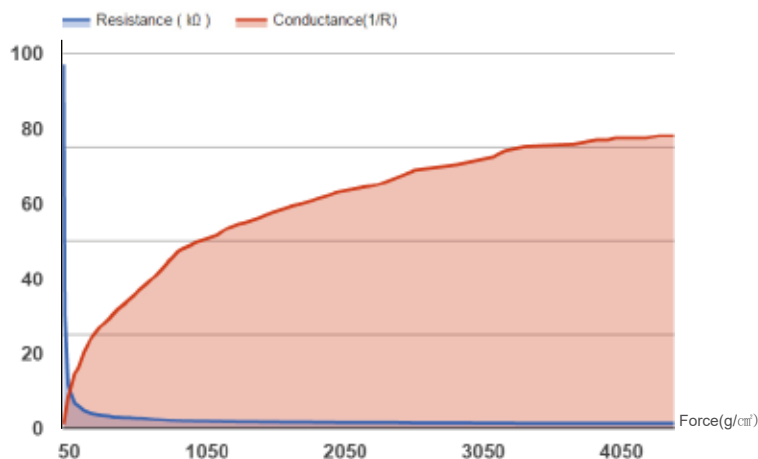
Model RA18-DIY

Unit	Description
Length	18.65mm
Width	18.32mm
Thickness	0.7mm
Sensing area	8mm
Sensing range	5gf ~ 4Kgf
Pin	Vin ● ADC out ●

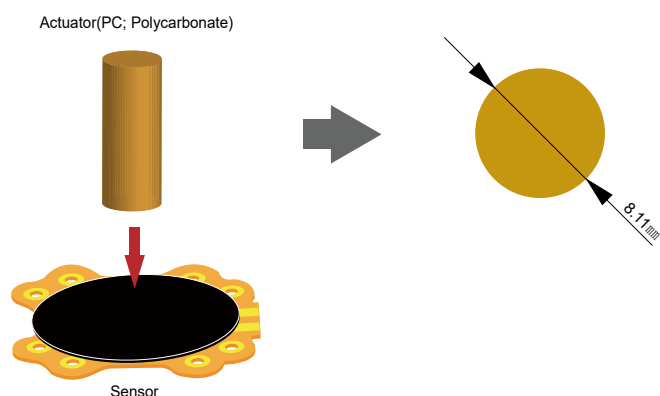
Sensor Mechanical Data(Scale : mm)



Graph) Force to Resistance and Conductance



Actuator



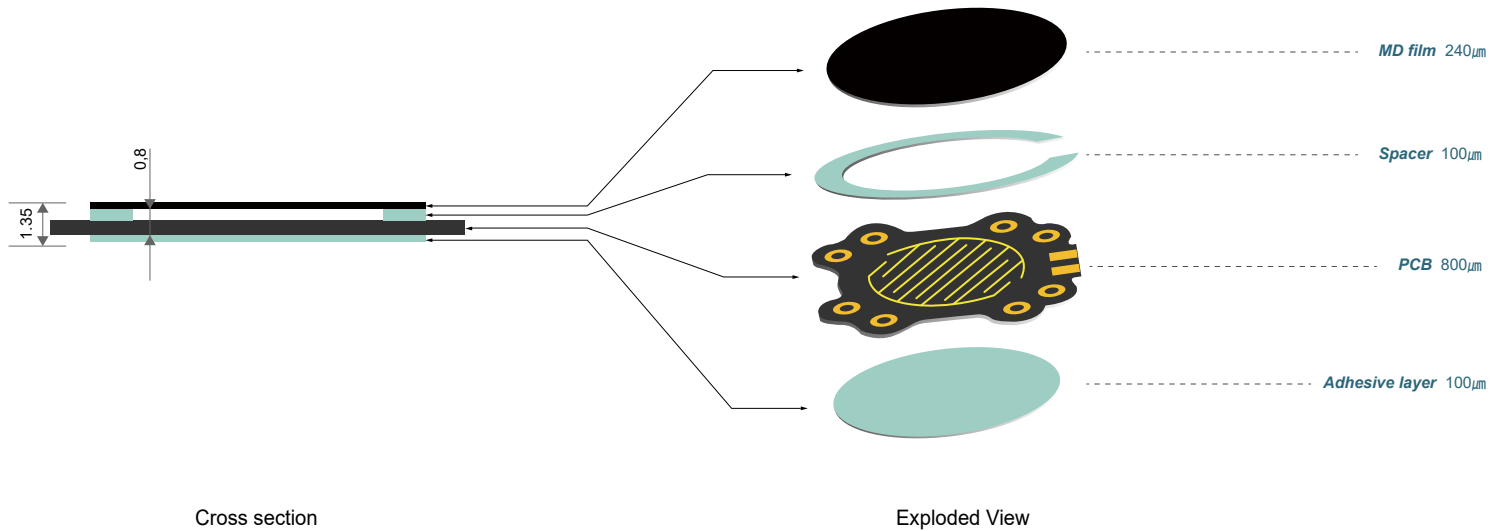
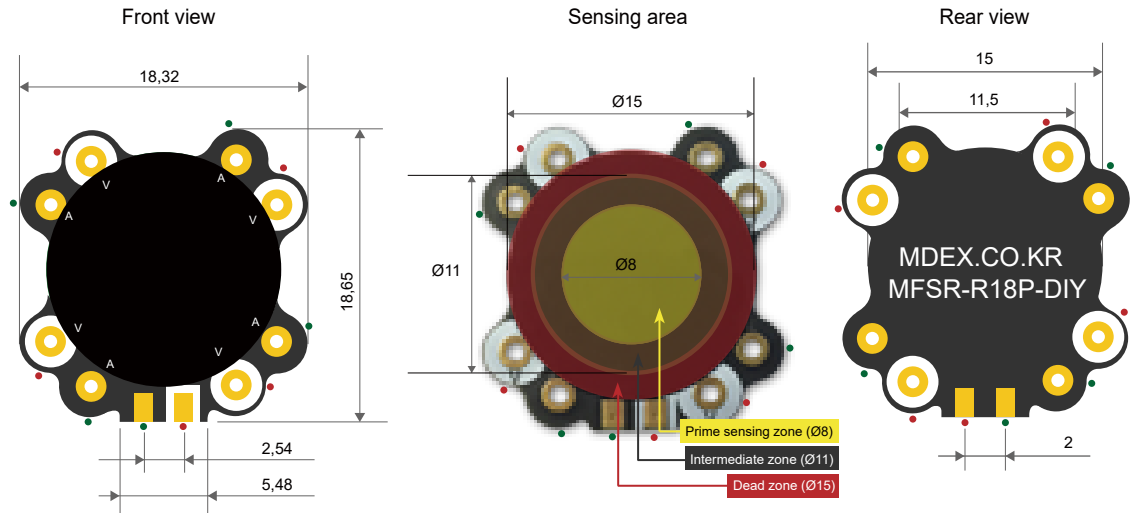
Sensing range is 5gf ~ 4Kgf while actuator is size of 8,11mm

Model RA18P-DIY

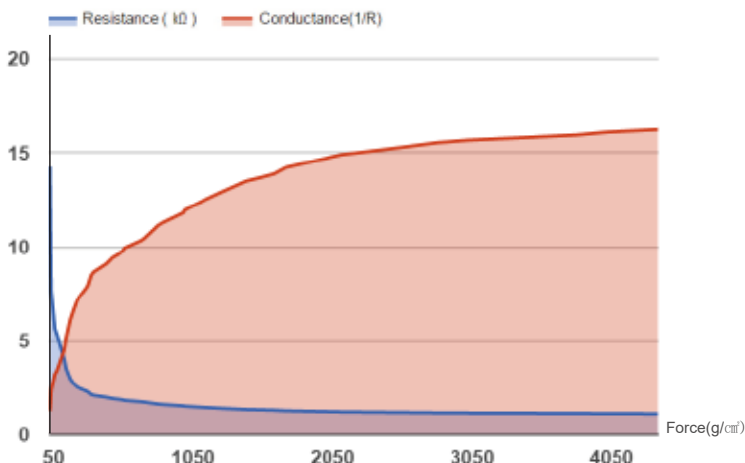
Model RA18P-DIY

Unit	Description
Length	18.65mm
Width	18.32mm
Thickness	1.35mm
Sensing area	8mm
Sensing range	5gf ~ 4Kgf
Pin	Vin ● ADC out ●

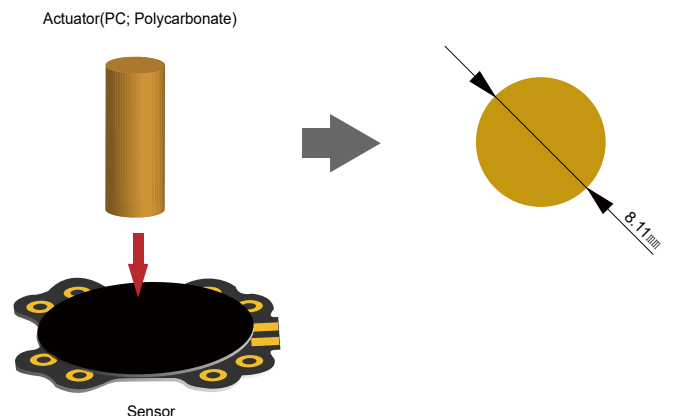
Sensor Mechanical Data(Scale : mm)



Graph) Force to Resistance and Conductance



Actuator



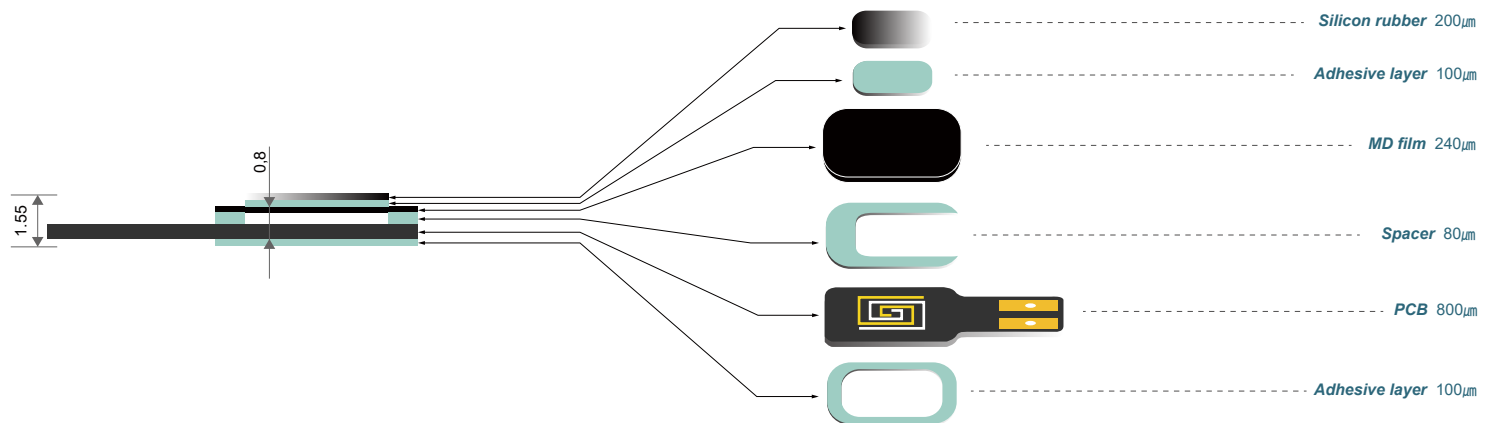
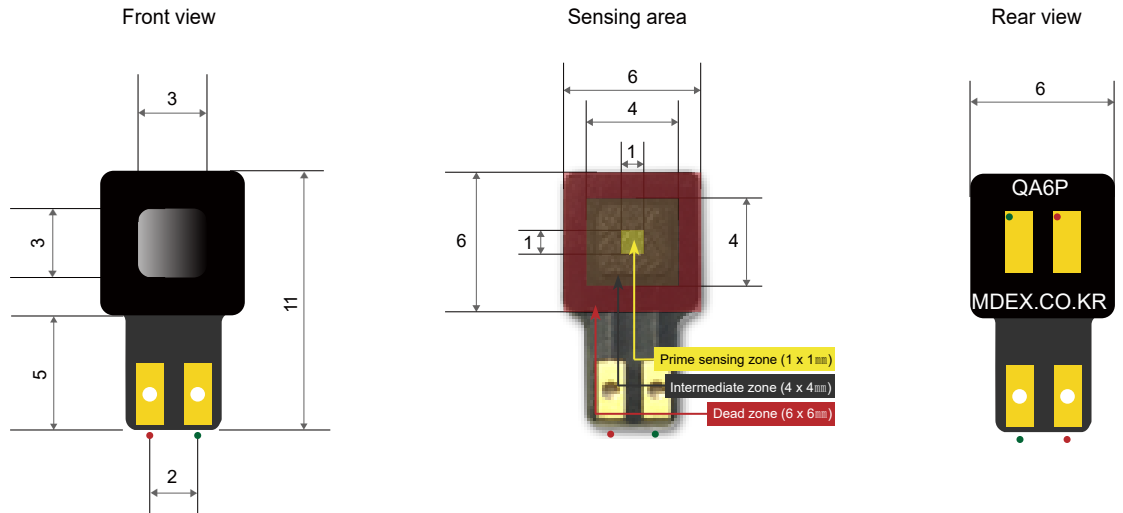
Sensing range is 5gf ~ 4Kgf while actuator is size of 8,11mm

Model QA6P

Model QA6P

Unit	Description
Length	11mm
Width	6mm
Thickness	1.55mm
Sensing area	1mm x 1mm
Sensing range	5gf ~ 4Kgf
Pin	Vin • ADC out •
Actuator layer	Silicon rubber

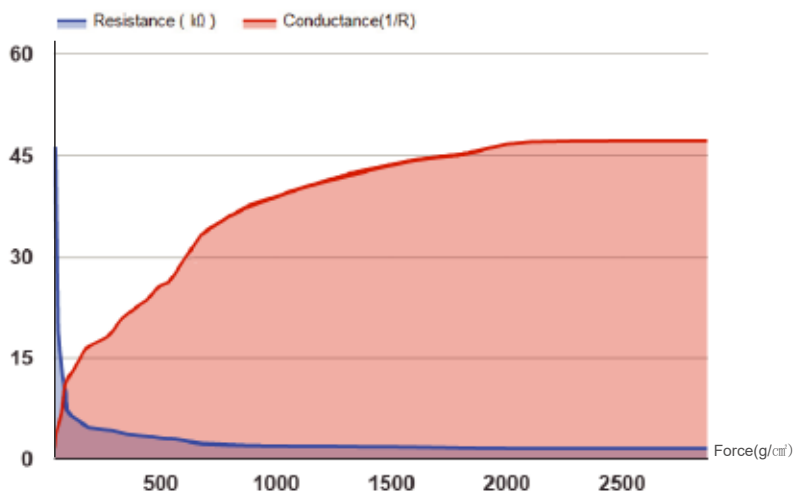
Sensor Mechanical Data(Scale : mm)



Cross section

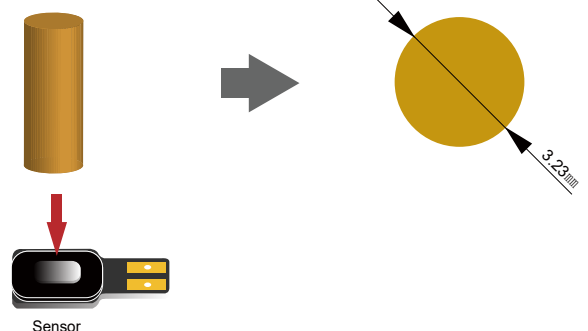
Exploded View

Graph) Force to Resistance and Conductance



Actuator

Actuator(PC; Polycarbonate)



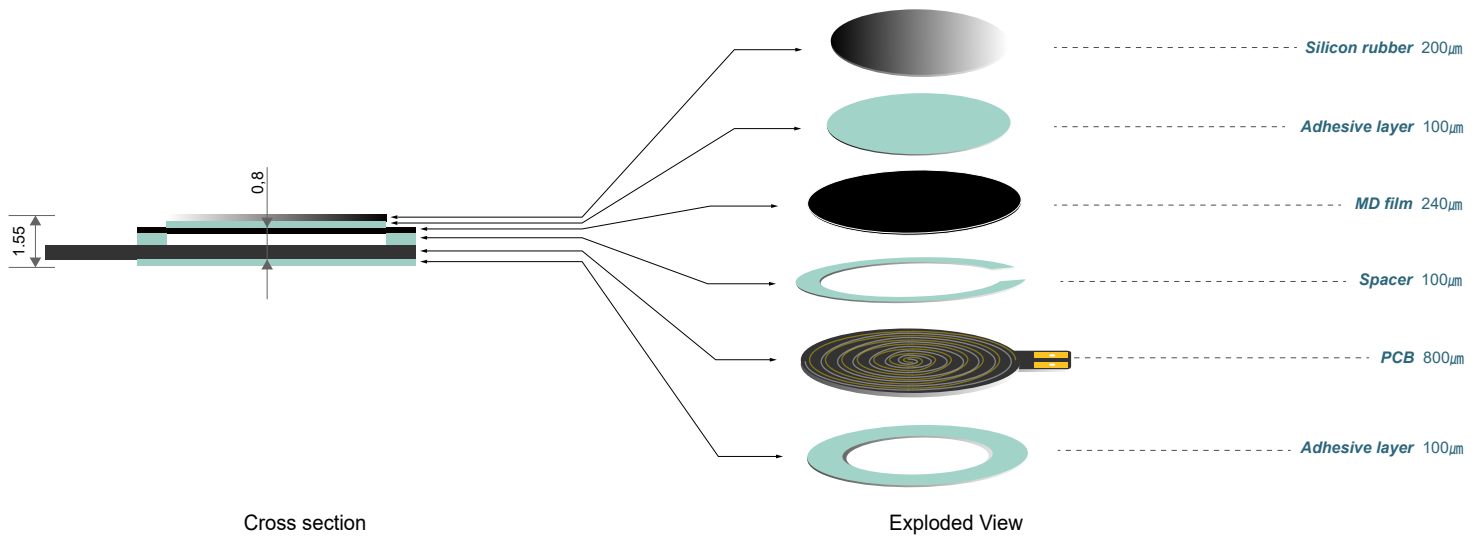
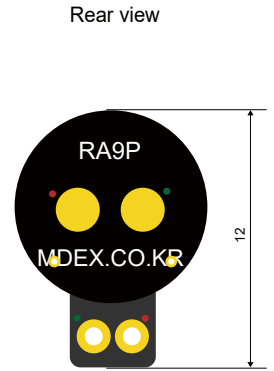
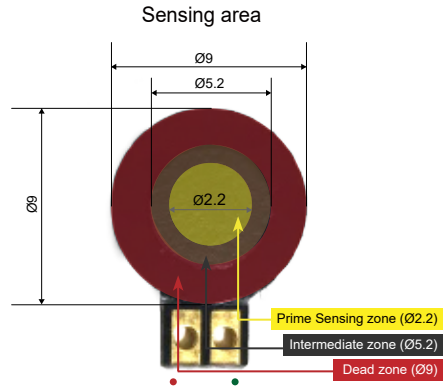
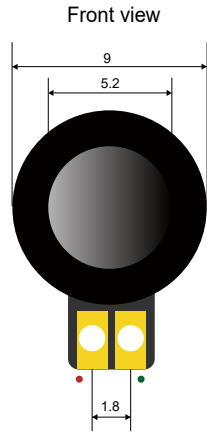
Sensing range is 5gf ~ 4Kgf while actuator is size of 3,23mm

Model RA9P

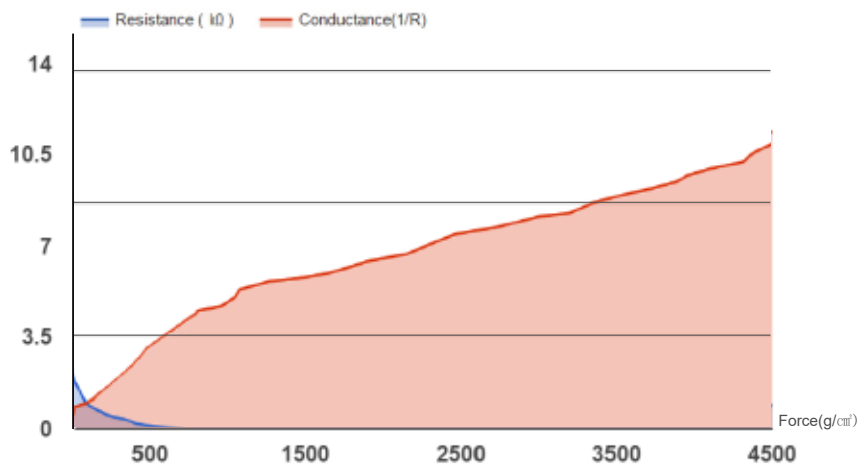
Model QA3040P

Sensor Mechanical Data(Scale : mm)

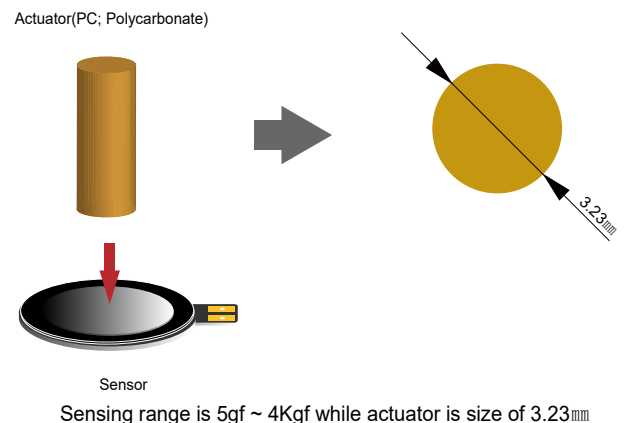
Unit	Description
Length	12mm
Width	9mm
Thickness	1.55mm
Sensing area	2.2mm
Sensing range	5gf ~ 4Kgf
Pin	Vin ● ADC out ●
Actuator layer	Silicon rubber



Graph) Force to Resistance and Conductance



Actuator

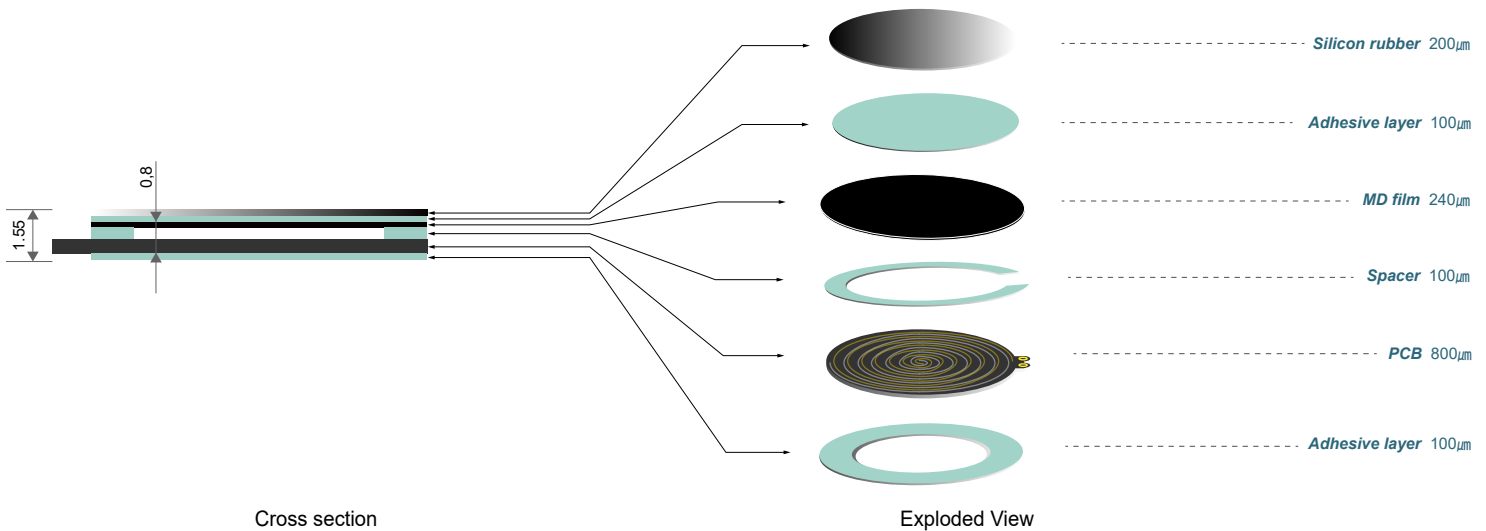
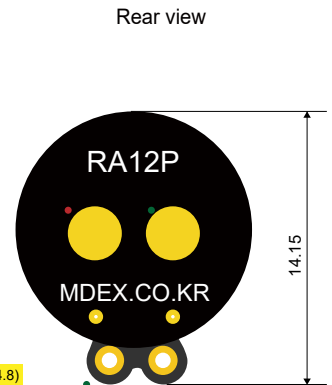
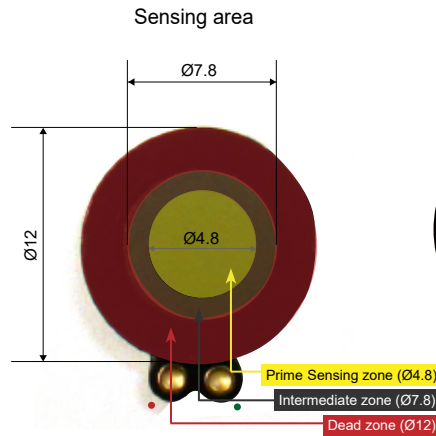
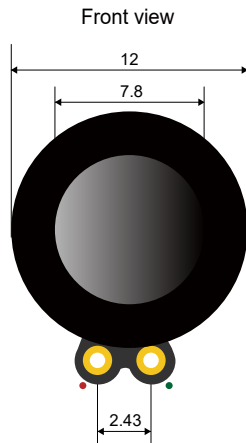


Model RA12P

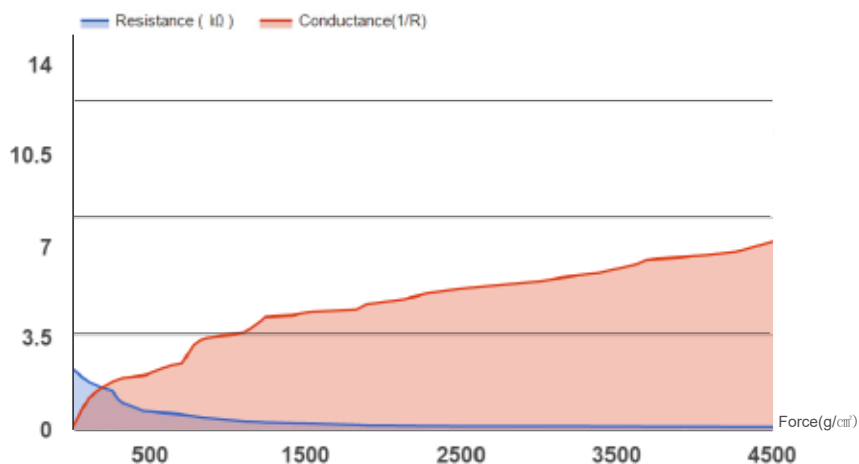
Model QA3040P

Sensor Mechanical Data(Scale : mm)

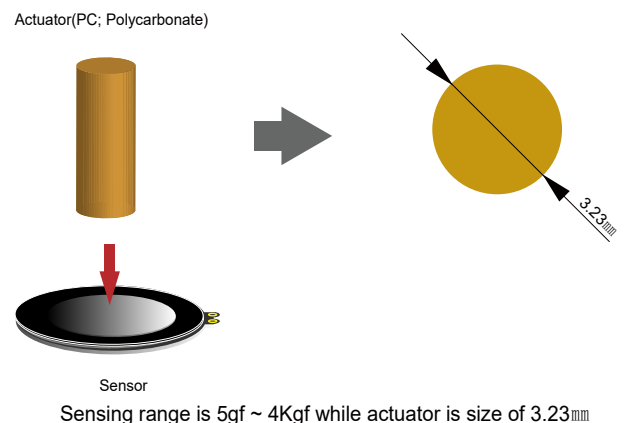
Unit	Description
Length	14.15mm
Width	12mm
Thickness	1.55mm
Sensing area	7.8mm
Sensing range	5gf ~ 4Kgf
Pin	Vin • ADC out •
Actuator layer	Silicon rubber



Graph) Force to Resistance and Conductance



Actuator

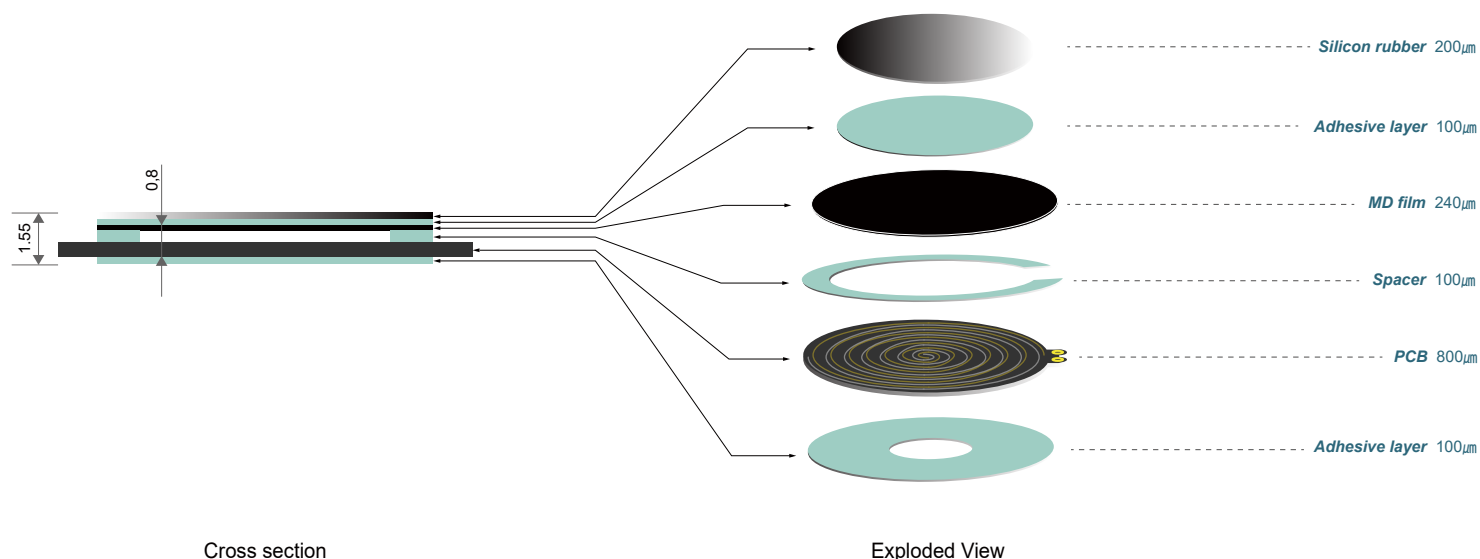
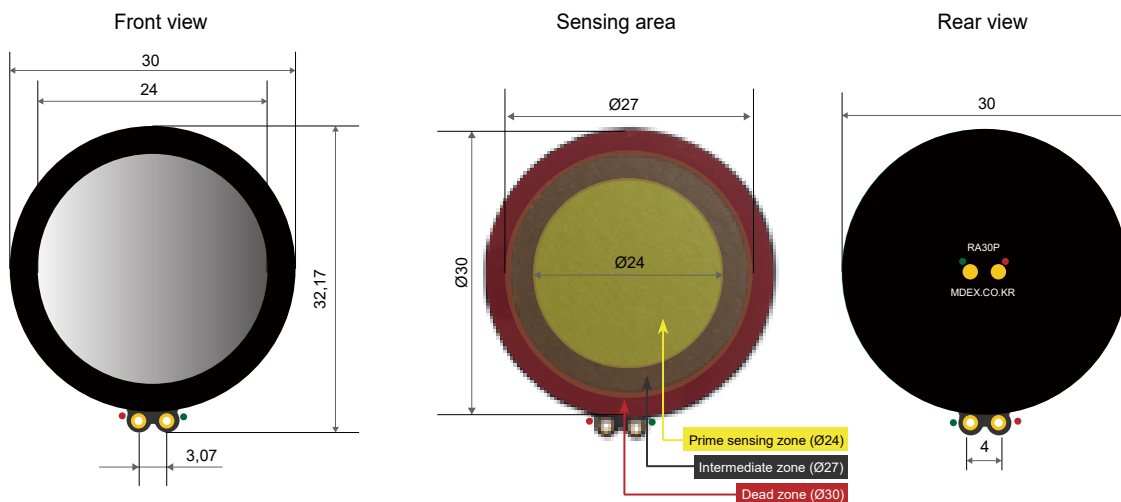


Model RA30P

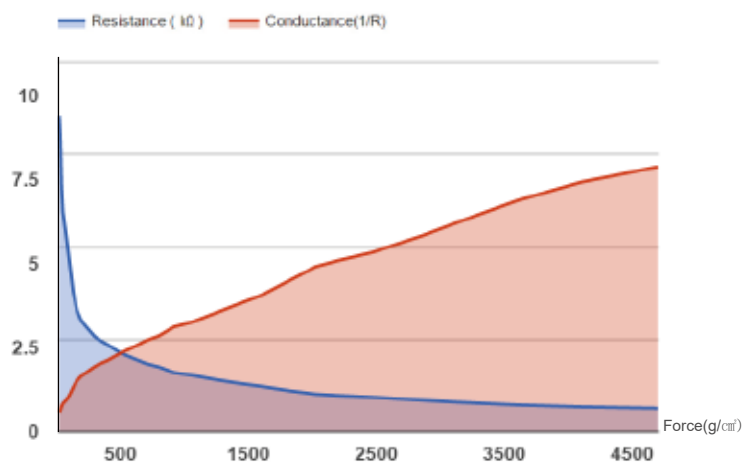
Model RA30P

Unit	Description
Length	32.17mm
Width	30mm
Thickness	1.55mm
Sensing area	24mm
Sensing range	5gf ~ 4Kgf
Pin	Vin • ADC out •
Actuator layer	Silicon rubber

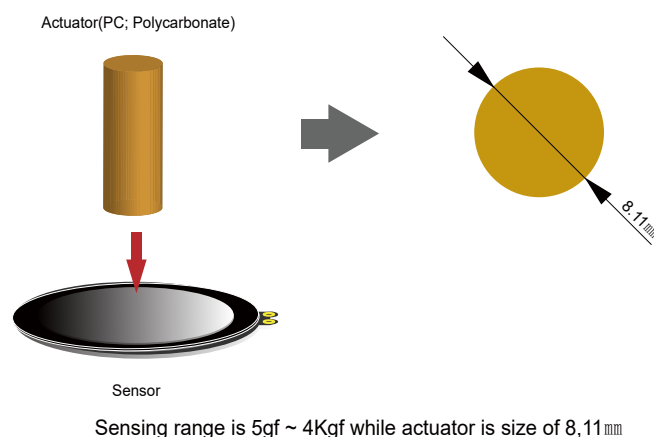
Sensor Mechanical Data(Scale : mm)



Graph) Force to Resistance and Conductance



Actuator

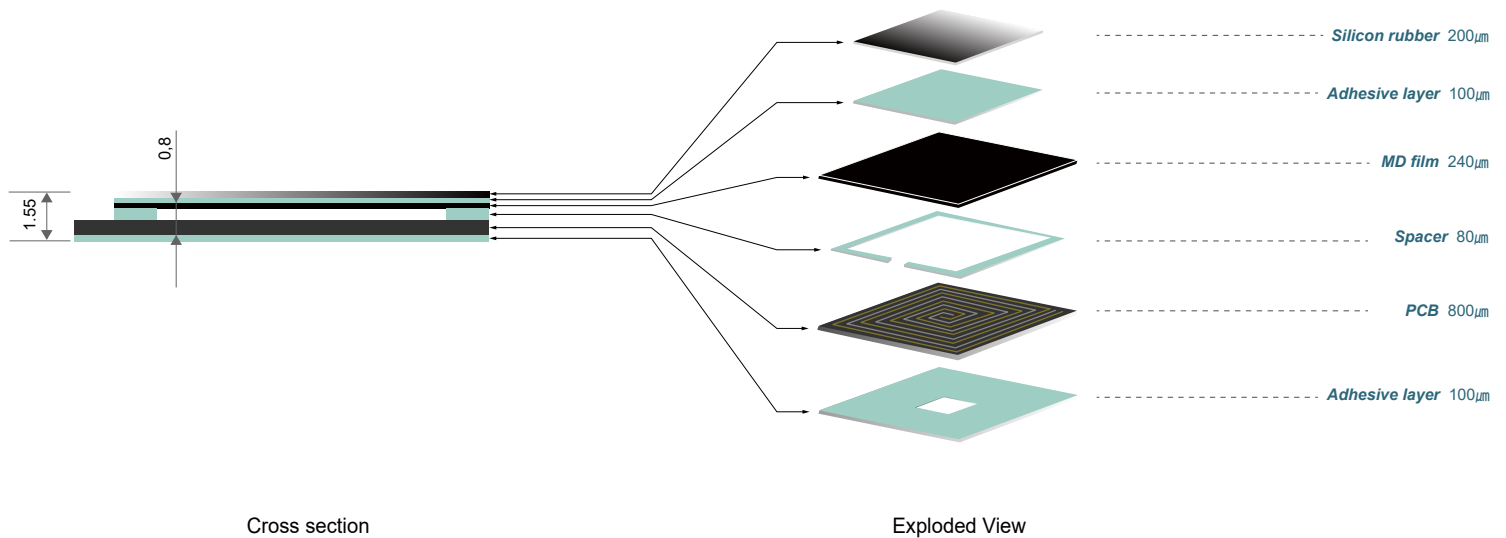
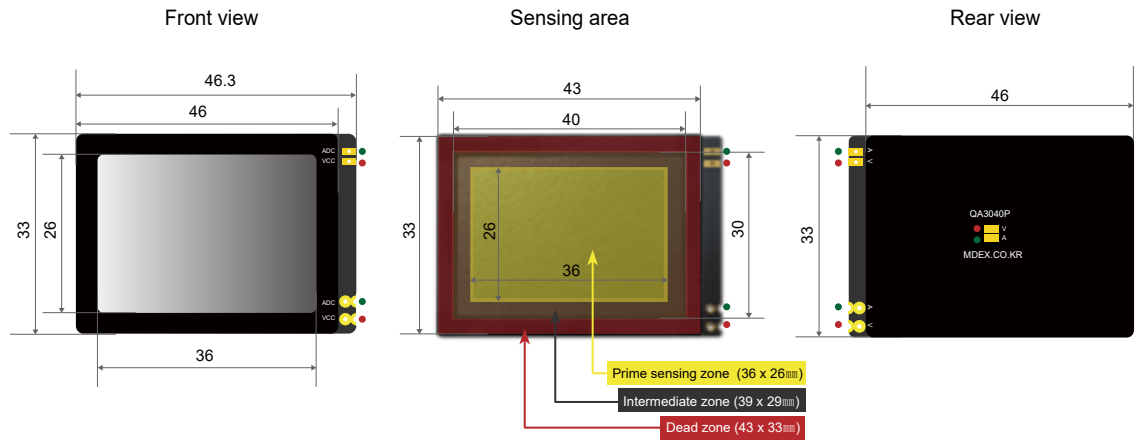


Model QA3040P

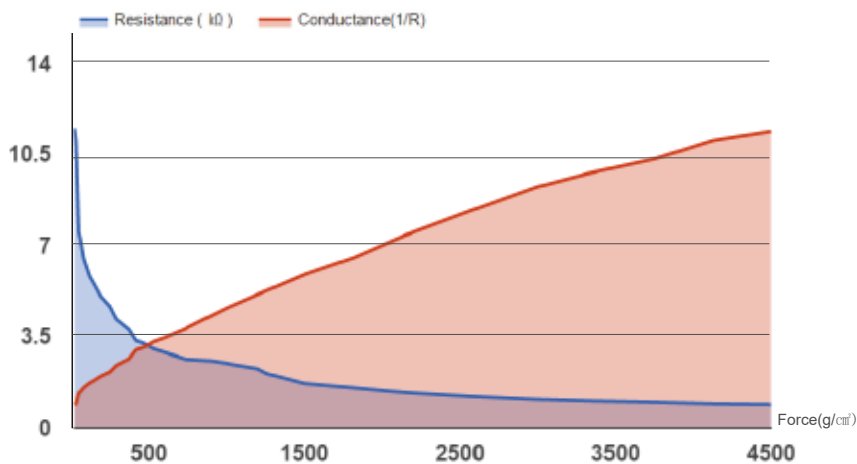
Model QA3040P

Sensor Mechanical Data(Scale : mm)

Unit	Description
Length	46.3mm
Width	33mm
Thickness	1.55mm
Sensing area	36mm x 26mm
Sensing range	5gf ~ 4Kgf
Pin	Vin ● ADC out ●
Actuator layer	Silicon rubber



Graph) Force to Resistance and Conductance



Actuator

