APPLICATION AND ARCHITECTURE

Membrane Pressure Sensor Design Options

Supplier-neutral design guide for defining a custom membrane pressure or force-sensing interface without unsupported product claims.

Function Detect presence, relative force or a defined actuation event	Architecture Printed sensing element, spacer, tail and support structure
Interface Controller input, calibration method and connector	Release basis Validated sensor construction and production-intent assembly

This guide replaces a third-party product specification. It does not reuse external model data, automotive claims or unverified test values.

1. Development Flow

2. Required Application Inputs

Input	Definition required
Sensing objective	Presence, threshold, relative force or position-related response
Load profile	Direction, contact area, range of use and overload scenario
Environment	Temperature, humidity, chemicals, vibration and installation
Mechanical stack	Cover, actuator, sensor support, adhesive and enclosure
Service profile	Actuation frequency, expected life and recalibration needs

SENSOR AND INTERFACE DESIGN

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3. Construction Definition

Construction topic	Project definition
Sensing element	Printed or laminated structure selected for the response target
Spacer / gap	Geometry controlling preload, activation and recovery
Tail	Exit direction, conductor layout, reinforcement and mating connector
Support	Flatness, stiffness and load distribution under the sensing area
Protection	Surface, edge seal and contamination controls for the application

4. Electrical Interface

Interface topic	Required content
Signal type	Controller input and expected sensor response model
Excitation	Voltage or measurement method defined by the electronics design
Calibration	Reference loads, points, algorithm and recalibration strategy
Filtering	Sampling, debounce, drift handling and fault detection
Connector	Pinout, contact finish, retention and strain relief

The sensor and controller are validated as one measurement system.

VALIDATION AND RELEASE

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5. Validation Plan

Validation group	Evidence to define
Functional	Response, repeatability, hysteresis and recovery method
Mechanical	Load distribution, support, assembly stress and overload behavior
Environmental	Project-specific exposure and post-conditioning acceptance
Durability	Actuation profile, rate, fixture and failure criteria
Production	Calibration, test fixture, traceability and inspection records

6. Drawing and Data Package

- Dimensioned outline, sensing area, tail and datums.
- Material and layer construction under revision control.
- Electrical pinout and controller interface.
- Calibration method, acceptance evidence and change-control requirements.

Only validated project-specific values may be published as product performance.