

# **FMA SERIES** **MICROFORCE** **SENSORS**

For Use in High-End Kitchen Appliances



**Honeywell**



# FMA SERIES MICROFORCE SENSORS FOR USE IN HIGH-END KITCHEN APPLIANCES

The FMA Series may be used in high-end kitchen appliances and commercial/industrial kitchen equipment such as mixers, kettles, and blenders, to provide precision speed control, as well as ingredient measurement and dispensing information.



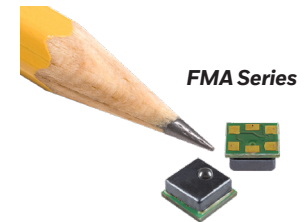
- 1 Ensures high-quality end products by accurately measuring weight of ingredients
- 2 Allows single-hand control for more control over operation
- 3 Provides variable speed control on throttle grip by translating applied force to desired speed
- 4 Detects bowl/receptacle absence/presence before starting the appliance
- 5 Measures weight of solid/liquid product dispensed into bowl/receptacle to provide fault detection feedback such as over/under amounts

The FMA Series piezoresistive-based force sensors offer a digital output for reading force over the specified full scale force span and temperature range. They are fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects, and nonlinearity using an on-board Application Specific Integrated Circuit (ASIC).

The direct mechanical coupling allows for easier interface with the sensor (using tubing, membrane or a plunger), providing repeatable performance and a more reliable mechanical interface to the application. These sensors offer a more stable output which is directly proportional to the force applied to the mechanically-coupled sphere.

The digital I<sup>2</sup>C interface permits multiple addresses on the same bus, allowing the use of multiple sensors and helping to reduce system complexity. The optional internal diagnostics function enables fault detection.

FMA SERIES SPECIFICATIONS	
CHARACTERISTIC	PARAMETER
Description	compensated/amplified
Force range	5 N, 15 N, 25 N
Output	SPI, I <sup>2</sup> C
Supply voltage	3.3 V, 5.0 V
Supply current, typ.	2.8 mA (3.3 V), 3.9 mA (5.0 V)
Operating temperature range	-40°C to 85°C [-40°F to 185°F]
Compensated temperature range	5°C to 50°C [41°F to 122°F]
Accuracy, typ.	±2% FSS BFLS
Total Error Band, max.	±8% FSS BFLS
Output resolution	12 bits
Long term stability	±1.6 FSS
Humidity	0% to 95% RH, non-condensing
Shock	MIL-STD-202, Method 213, Condition A (50 G)
Vibration	MIL-STD-202, Method 214, Condition 1F (20.71 Gms)
Life	1 million full scale force cycles minimum
Package size	5 mm x 5 mm (0.20 in x 0.20 in)



Sensor optimized to be as small as possible while still allowing for mechanical coupling.

## PRODUCT NOMENCLATURE

FM <sup>1</sup> MicroForce Sensors	A Type	M Coupling	S Contact Element	D Option Code	XX Option Code 1	025 <sup>2</sup> Force Range	W Force Unit	C Force Type	S Output	C <sup>3</sup> Transfer Function	3 Supply Voltage
	A Compensated/ amplified	M Mechanical	S Sphere		XX Future placeholder	005 5 (Newtons) 015 15 (Newtons) 025 25 (Newtons)	W Newton (N)	C Compression	S SPI 2 I <sup>2</sup> C, Address 0x28 3 I <sup>2</sup> C, Address 0x38 4 I <sup>2</sup> C, Address 0x48 5 I <sup>2</sup> C, Address 0x58 6 I <sup>2</sup> C, Address 0x68 7 I <sup>2</sup> C, Address 0x78	A 10% to 90% C 20% to 80%	3 3.3 V ±10% 5 5.0 V ±5%

<sup>1</sup> Custom configurations are available upon request. Please contact Honeywell Sales.

<sup>2</sup> Three characters specify the desired force level; allowable characters are the numbers 0 through 9 for currently configurable force ranges.

<sup>3</sup> For other available transfer functions, contact Honeywell Customer Service.

**⚠ WARNING**  
**PERSONAL INJURY**  
DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.  
**Failure to comply with these instructions could result in death or serious injury.**

**⚠ WARNING**  
**MISUSE OF DOCUMENTATION**  
• The information presented in this document is for reference only.  
Do not use this document as a product installation guide.  
• Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.  
**Failure to comply with these instructions could result in death or serious injury.**

## Honeywell Sensing and Internet of Things

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FUTURE  
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