



# Haptic Solutions for Industrial Applications

Bring the consumer touch experience to industrial controls

## Touch interface trends

As industrial human machine interfaces (HMI) start to develop more tablet-like control panels, the number of touch screens used in industrial applications is increasing. By using reliable touch interfaces, failure-prone moving parts can be removed, and moisture resistance is improved. Some of the industrial applications that have started to use more touch interfaces include point-of-sale devices, data terminals, ATMs, large home appliances, home automation systems, as well as industrial manufacturing machinery. Generally, these applications have control panels that provide visual and/or audible feedback. This can be a problem for individuals that are hearing impaired or individuals that are not used to using touch interfaces. By introducing tactile feedback to touch interfaces in these applications, users gain extra confidence that their input was received by the device, and task completion times are reduced. This ultimately increases the user's overall experience and the HMI system's efficiency.

## Where does TI come in?

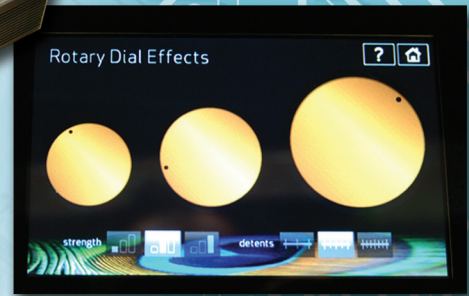
To include tactile feedback in industrial HMIs, haptic technology can be used. Haptics, by definition, refers to the sense of touch and is a technology that adds tactile feedback to electronic devices through the use of vibrations. Haptics can help emphasize the feeling of precision in touch controls. In addition, haptics can give that "mechanical-like" feel to a touch screen.

Texas Instruments offers a complete line of haptic drivers which have the ability to drive eccentric rotating mass (ERM), linear resonant actuator (LRA), and piezoelectric actuators. TI's haptic drivers have the ability to provide high quality haptic feedback that is consistent across time, environmental conditions and unit variations. This allows for maximum impact to the user. Within TI's haptic drivers is the ability to generate the waveform as well. With TI's haptic drivers you can add that extra sensory element that is missing in modern day touch interfaces.

Visit [www.ti.com/haptics](http://www.ti.com/haptics) for more information.

## 7" Haptic Touch Module

- TI DRV8601
- Provides haptic effects through an industrial-grade ERM actuator
- 7" floating-screen LCD
- Produces localized haptics



## LCD Thermostat/ Building Automation Panel

- Shows 'floating screen' haptics
- Provides haptic effects using TI haptics driver
- Multiple GUI apps show different usage cases
- Android based



Home Automation/Thermostat



Refrigerator Panel

## Haptic Drivers

Device	Description	V <sub>OUT</sub> (Max) (V)	Input Signal	I <sub>0</sub> (Typ) (mA)	Startup Time (ms)	Haptic Actuator Type	V <sub>s</sub> (Max) (V)	V <sub>s</sub> (Min) (V)	Operating Temp Range (°C)	Package	Price*
DRV2605L	Haptic Driver for ERM/LRA with Built-In Library and Smart Loop Architecture	5.5	I <sup>2</sup> C, PWM, Analog	0.5	0.7	ERM, LRA	5.2	2	-40 to 85	10VSSOP, 9DSBGA	1.65
DRV2604L	Low Voltage Haptic Driver for ERM and LRA with Internal Memory and Smart Loop Architecture	5.5	I <sup>2</sup> C, PWM, Analog	0.5	0.7	ERM, LRA	5.2	2	-40 to 85	10VSSOP, 9DSBGA	1.2
DRV2605	Haptic Driver for ERM/LRA with Built-In Library and Smart Loop Architecture	5.5	I <sup>2</sup> C, PWM, Analog	—	0.7	ERM, LRA	5.5	2.5	-40 to 85	9DSBGA, MSOP-10	1.60
DRV2603	Haptic Driver with Auto Resonance Tracking for LRA and Optimized Drive for ERM	—	PWM, Analog	1.5	1.3	ERM, LRA	5.2	2.5	-40 to 85	QFN-10	0.70
DRV2667	Piezo Haptic Driver with Boost, Digital Front End, and Internal Waveform Memory	200	I <sup>2</sup> C, PWM, Analog	0.13	2	Piezo	5.5	3	-40 to 85	QFN-20	2.95

\*Suggested resale price in U.S. dollars in quantities of 1,000.

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