

ActiveTouch Technology

BEYOND DURABLE.™

- APPLIANCES
- ATMs/VENDING/GAS PUMPS
- AUTOMOTIVE
- CLEAN ROOMS
- DECORATIVE LIGHTING & CONTROL
- ELEVATORS
- FAUCET/SHOWER/SPA CONTROLS
- FOOD PROCESSING
- GAMING
- INDUSTRIAL & PROCESS CONTROL
- MEDICAL
- MILITARY/AEROSPACE
- PETROLEUM EXPLORATION & REFINING
- PHARMACEUTICALS
- RECREATIONAL MARINE
- SECURITY & PRISONS
- STERILE ENVIRONMENTS
- UNDERWATER ENVIRONMENTS
- VANDAL RESISTANT POINT OF SALE



ACTIVETOUCH TECHNOLOGY

ActiveTouch patented touch-sensitive technology brings a whole new level of durability to switches, sensors and control systems. Whether you define durability as long life, resistance to temperature and environment, resistance to physical damage or just a robust design, our technology excels at each of these criteria. Imagine switches with no moving parts and virtually unlimited lifespan. Imagine seamless control panels where water or chemical intrusion is impossible. Imagine switches made from 1/2 inch thick stainless steel—impervious to even a hammer blow. Imagine sensors integrated with intelligence to report diagnostic information or adapt to the surrounding environment to ensure uninterrupted operation. All of these are possible and more. Existing touch-sensitive technologies are fragile, limiting the scope of their uses and applications. With ActiveTouch, you can have the advantage of touch-sensitive technology without sacrificing durability.

We are confident that you will find this the most durable technology available today. ActiveTouch—Beyond Durable.

CAN IT DO “THIS”?

CAN IT DO “THAT”?

In the past, each time you wrestled with such issues—trying to decide whether to use “this” technology or “that” one—you had to research a dizzying series of strength and weakness characteristics.

Welcome to ActiveTouch, where you’ll find that the answers to most of your design and application questions get a very quick, positive “yes” answer. Now, after seven years of intense research and development, ActiveTouch is here, offering a switch and sensor technology that masters a vast and diverse array of those same parameters in a most unique way.

ALL ACTIVETOUCH APPLICATIONS...

- Work with metal, glass, stone/granite and some plastics.
- Are impervious to moisture—including direct exposure to pressurized water and can even work underwater (NEMA 4X / IP68).
- Can be operated with gloved or protected hands.
- Are Vandal, Impact, Shock and Vibration resistant.
- Offer variable output or pressure sensitive operation.
- Can operate in extended temperatures.
- Are not affected by sand and dust.
- Can be used with overlays and LED options.
- Unaffected by, and not a source of, electromagnetic radiation.
- Even offers a built-in diagnostic mode and fault sensing.



What Other Technology Provides Unlimited Opportunities Like This?

TW ActiveTouch™

THINKING OUTSIDE THE BOX

What if You Weren't Limited to a Narrow Range of Traditional Design Features When You Tackle Your Next Design Project?

Imagine how much better your designs and products could be—visually and functionally—if you didn't need to be concerned with most of today's "status quo" engineering and operator interface issues:

- How and where to cut holes for switches and sensors?
- Whether or not you have placed the components too close together?
- Which traditional switch form should be used to suit the end-product environment?
- What design and material tradeoffs will you have to make to get the switching/sensing you need?
- How to achieve smooth appearance, sealed spacing, and pleasing visual flow in your designs?
- How to work around inadequate durability?

ActiveTouch, the Next Generation of switching and sensing technology, frees designers and engineers from the technology constraints associated with traditional electronic components. You'll be innovating in a "no limitations," free-form environment, able to employ limitless creativity on designs, shapes, and materials, helped by a creative process not possible with any traditional applied science.

Imagine the footprint of your next design opportunity with the degree of freedom you will enjoy with ActiveTouch.

Think outside the box. Explore solutions unavailable in the past. Create value in new ways. Produce results that make a difference—all with ITW ActiveTouch.



Engineering concepts

PRINCIPLE OF OPERATION

Step 2

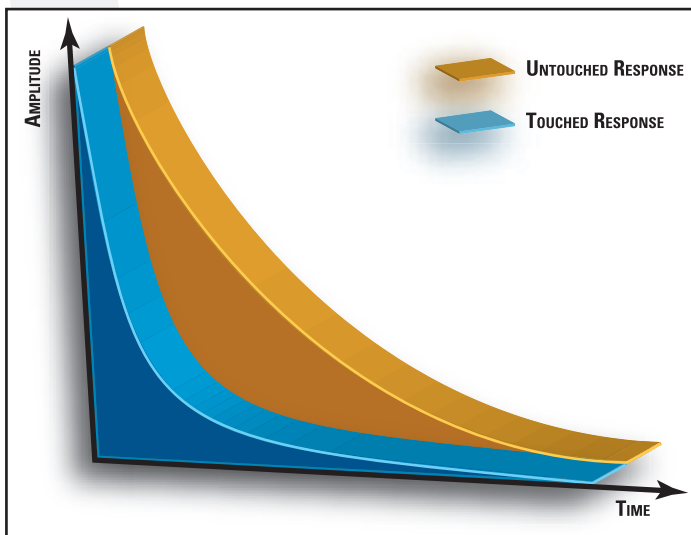
The basic principle is that a material capable of supporting shear and torsional mechanical waves at ultrasonic frequencies can have those waves trapped or localized by contouring or bonding decals to its surface. These trapped energy regions are set into motion with transducers and act as high quality resonators.



Vandal-resistant and contamination-proof installation

Step 1

When the time to a threshold value is lower than the preset value, the microcontroller is programmed to indicate switch actuation. This is a continuous process occurring every few milliseconds.



The decay rate has changed. Actuation is triggered



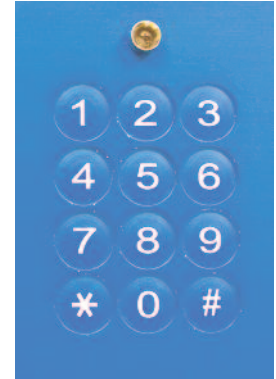
Step 5

APPLICATIONS

ActiveTouch Switch technology is available in "modular" switches, keypads, and keyboards, or it can be integrated into custom bezels or panels. ActiveTouch products are vandal proof, waterproof, shock and vibration resistant; ideal for the harsh and hazardous environments typical of outdoor, industrial, security, medical, and military applications. ActiveTouch switches offer many other additional advantages not found in traditional switches. Designers and their applications can now enjoy an input device that is insensitive to liquid spills and other contaminants but has a familiar tactile look and feel.

IDEAL APPLICATIONS

- Appliances
- ATMs
- Automotive (On- or Off-road)
- Clean Rooms
- Decorative Lighting & Controls
- Elevators
- Faucet / Shower / Spa Controls
- Food Processing
- Gaming
- Hazardous Environments
- Industrial & Process Control
- Medical Equipment & facilities
- Military / Aerospace
- Overlay and LED options are possible
- Petroleum Exploration & Refining
- Pharmaceutical
- Recreational Marine
- Security or Prison
- Sterile Environments
- Underwater Environments
- Vandal Resistant Point of Sale



Industrial Control Panel

This technology also offers significant advances and advantages as a sensor.

PROMINENT SENSOR TYPES

- Ice sensor
- Fatigue/void sensor
- Liquid Level Sensor
- Mass loading sensor
- Viscosity sensor
- Miniature sensors
- High Q resonators



Single switch with center removed showing PCB



ACTIVETOUCH ADVANTAGES

- Vandal Resistant
- Waterproof (NEMA 4X / IP68)
- Impact and Vibration Resistant
- Gloved or Protected hand Operation
- Extended Temperature Operation
- Variable Output or Pressure Sensitive
- Not affected by Sand or Dust
- Operates Underwater
- Unaffected by and not a Source of Electromagnetic Radiation
- Overlays or LED options are Available

STANDARD PRODUCTS FEATURING THE ACTIVETOUCH TECHNOLOGY

- Keypads
- Switches
- Halo Illumination Kits
- Check them out at www.ActiveMetal.com

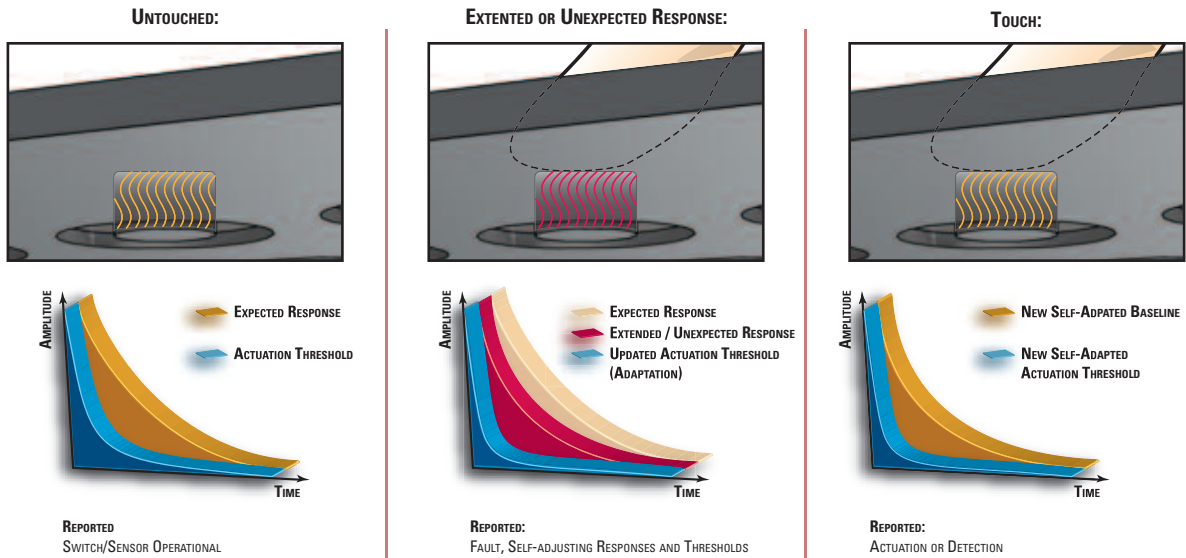
COMPETITIVE COMPARISON

TECHNOLOGY / CHARACTERISTICS	ACTIVETOUCH	CAPACITIVE	ELECTRO-MECHANICAL	EMF	PIEZO
LIFE / DURABILITY	+100 million Virtually unlimited, No moving parts, impact, shock and vibration resistant	+20 million Long Life, Durability limited by materials and thickness	Up to 10 million low / med Life, Affected by impact, shock, vibration and current (load)	+20 million Long Life, Durability limited by materials and thickness	+20 million Long Life, Durability limited by materials and thickness, Affected by impact, shock, vibration and current (load)
PANEL THICKNESS	0.030" (0.762 mm) to 0.5" (12.7 mm)	Less Than 0.125" (3.175 mm)	0.5" (12.7 mm) with bushing or panel mount options	Less Than 0.25" (6.35 mm)	0.030" (0.762 mm)
MATERIALS	Aluminum, stainless-steel, ceramics, stone, granite, glass and some plastics	Metal (only when isolated), plastics and glass	Any	No metals, only non-conductive plastics and glass	Metal only
INTERFACE	Finger, glove, rubber, overlays	Conductive materials only	Any	Conductive materials only	Any
SUSCEPTIBILITY INTERFERENCE	None	EMI, ESD susceptible	None	RFI, EMI and ESD susceptible	ESD susceptible
LINEAR DENSITY	6 per Inch	2 per inch (must be isolated)	Limited by physical construction	2 per inch (limited by size of sensor)	1–2 per inch (must be isolated)
INTELLIGENCE	Yes, Self-adapting, Self-diagnosing, Error reporting, Communications (RS232, USB, CAN Bus, etc.	None, cannot distinguish between accidental and intentional actuations	None	None, cannot distinguish between accidental and intentional actuations	None
SEALING	Completely sealed, Not effected by water pressure	Partially sealed, Moisture causes false actuations	Available	Partially sealed, Moisture can interfere with sensor operation	Sealed, but can not be submerged and may falsely actuate under pressure
DESIGN LIMITATIONS	Limited only by your imagination	Capacitive sensors cannot be integrated into existing enclosures Capacitive sensors cannot be sterilized or exposed to moisture, explosive, and corrosive conditions	Electro-mechanical switches require panel cut-outs and can not be located on curved surfaces	EMF has limited ability to be used in harsh environments	Piezo-electric sensors are suited for use only on extremely thin metal surfaces and never with elastomeric overlays As a high volume manufacturing matter, piezo is the most expensive

FIRMWARE INTELLIGENCE

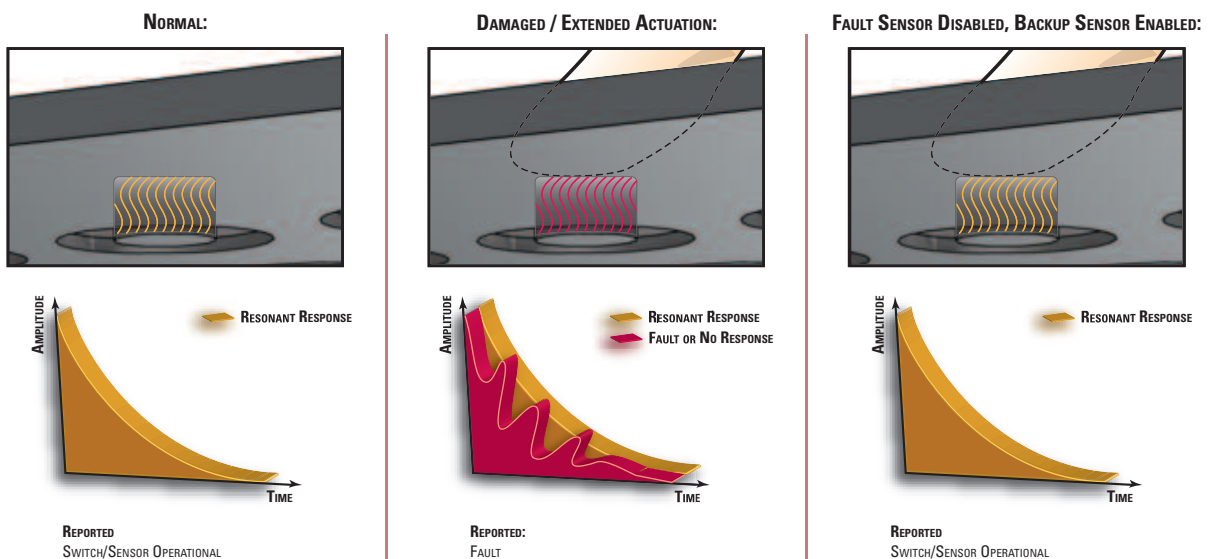
Our engineers will work with you to apply and tailor our firmware so that it produces the switch or sensor that's right for your application. Whether you require features like a specific communication protocol (RS232, USB, CAN Bus, etc.), error reporting, pressure sensitivity, networking capabilities, or variable output, ActiveTouch sensors and their programmable functions can be designed to meet your every need. In addition, the firmware also includes a self-adaptation capability which is especially useful in mission critical applications. The firmware will determine after repeated monitoring and averaging of the the ultrasonic signals if they need to be adjusted to account for damage, temperature or foreign material interference within the active switch area. This automatic process repeats continuously without user intervention and ensures continual operation.

SELF-ADAPTING



The firmware can also be programmed with self-diagnosing capabilities which is useful in mission critical applications. ActiveTouch switches can sense their own abnormal operation or predict an imminent failure and notify the user. Or with the use of multiplexers the switch can be programmed to transfer the actuation area to a backup switch location, completely disabling the abnormal switch.

SELF-DIAGNOSING



TECHNICAL CHARACTERISTICS

MECHANICAL SPECIFICATIONS

- Operational Life: +20mm cycle, -60C to 85C (Typical)
- Minimum Actuation Force: 0 – 100lbs+ (Typical)
- Materials: Stainless Steel
Aluminum,
Brass,
Zinc,
Die Cast,
Plastics,
Glass,
Ceramics,
Stone
- Water Resistance: Up through IP68
- Mechanism: 100% Solid-state, No Moving Parts

ENVIRONMENTAL SPECIFICATIONS

- Operating Temperature Range: -40° C to +85° C (Typical)
- Storage Temperature Range: -55° C to +125° C (Typical)
- Relative Humidity: No Effect
- Shock: Tested to 30g in each Axis
(drop test from 20 ft to concrete)
- Vibration: Tested at 4 hours each Axis
(actuated during vibration)
- Tested to Protions: MIL-STD-202, MIL-STD-461C,
MIL-STD-810E and MIL-STD-901D,
Navy Safety of Flight — SOF

ELECTRICAL SPECIFICATIONS

- Voltage: +5 VDC, 10 –24 VDC \pm 5% or
per customer specifications
- Current 100mA or per customer specifications
- Contact Resistance: None
- Contact Bounce: None
- EMI/RFI: No Effect

FUNCTIONAL OPERATION SPECIFICATIONS

- Momentary / Maintained
- Proportional
- Normally Open / Normally Closed
- Impact: 1kg Shock Test
- Make / Break via Transistor

FEEDBACK MECHANISMS

- Haptic / Tactile feedback
- Overlays
- Illumination
- LCD's
- Audible BEEPERS / Signals
- RS232, USB, CAN Bus, etc.

ABOUT ITW ACTIVE TOUCH

Headquartered in Buffalo Grove, Illinois, we manufacture switches, sensor, and electronic control solutions from the United States, United Kingdom, and Taiwan. ITW ActiveTouch is a division of Illinois Tool Works (ITW), a diverse manufacturing corporation with additional operating divisions worldwide. Coordinating the corporation's resources with the skills and ingenuity of our engineers provides customers with the ITW Advantage. Delivering customized solutions to meet demanding customer requirements is our forte.

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