Innovative solutions in Touch Screen Technology

Technical Specifications for a 5 Wire ULTRA Armoured Glass Touch Screen

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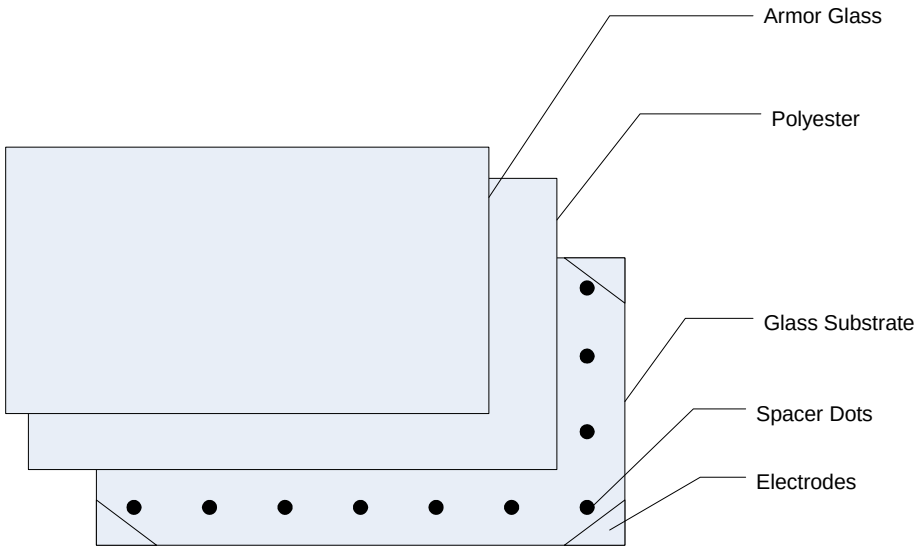
1. Mechanical Specifications

1.1 Construction Overview

A D Metro five-wire resistive touchscreens consist of a stackup of various different layers of varying electrical and material characteristics. A glass substrate is used as a base for the sensor, typically made of clear soda lime glass, along with a layer of PET polyester used as the topsheet of the sensor. The top of the glass layer and bottom of the polyester layer are coated with an Indium Tin Oxide (ITO) coating which have a uniform resistance across the surface of sheet. This coating is chosen for its electrical conduction and environmental characteristics. These two layers are separated by use of transparent spacer dots, which are printed on the ITO surface of the glass substrate.

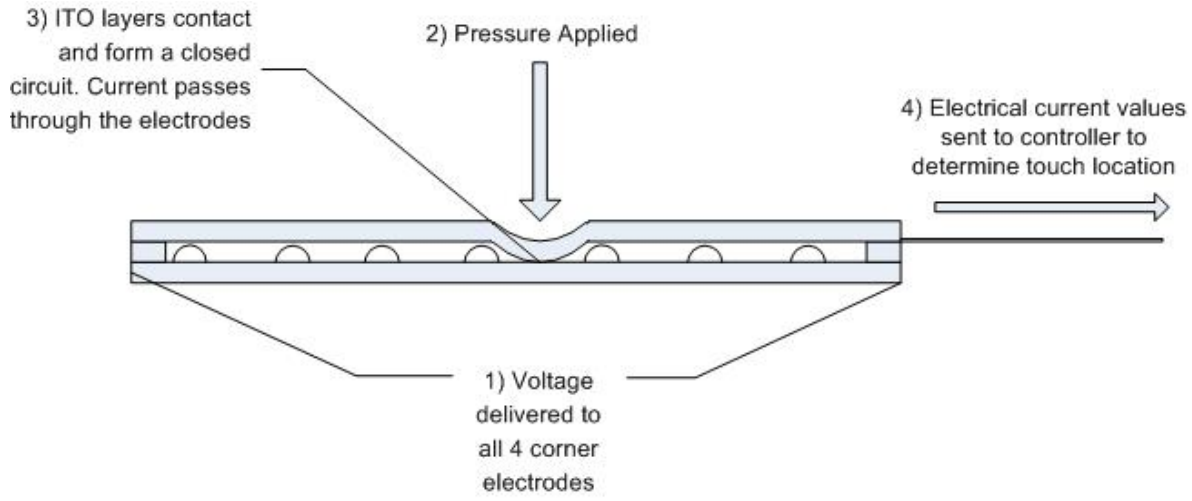


ULTRA touchscreens function similar to five-wire resistive technologies but have the added bonus of a highly durable yet flexible armored glass layer laminated on top of the polyester. It nearly doubles a standard resistive touchscreen's lifespan by reducing the curve at which it the top glass/polyester layer will bend, resulting in a service period before the ITO coating begins crack from usage. The increase in pressure required for an activation is offset by a wider dot spacing on the glass substrate.

1.2 Functional Overview

Five-wire touchscreens have electrodes at each of the four corners of the glass, to which low voltages are delivered equally by the controller circuit. The polyester layer's function is that of a switch, and before any touch is made, no voltage is applied to it by any outside sources, and is grounded. Once a touch is made, the conductive coating of the polyester comes into contact with the conductive coating of the glass substrate. The polyester coversheet then begins to draw current from each of the four electrodes in

various amounts, depending on the location of the touch. The current passing through each of the electrodes is read by the controller and translated into X-Y coordinates, which is used by the software to determine where the touch has occurred.



1.3 Connector and Cable Information

ULTRA touchscreens use Nicomatic polyester flex circuit cables constituting of five wires with centres spaced apart by 0.1”, or 2.54 mm. The cables usually exit from the short side of the sensor, and are typically 0.6”, or 15.24mm, wide and 15.75”, or 400mm, long. Custom cable locations and lengths are available. They are terminated in a Nicomatic 5 pin housing amp, with dock centres also separated by 0.1”, or 2.54mm. These cables are highly flexible and can be bent up to a radius of 0.125”, or 3.175mm, without affecting the touchscreen’s response.

1.4 Armor Glass Information

This flexible armor glass sheet is laminated onto the polyester coversheet on all ULTRA touchscreens. It is 0.0039”, or 0.1mm, thick and is made of borosilicate glass, which offers greater resistance to thermal shock than other standard glasses due to its low coefficient of thermal expansion, and has increased protection, strength and durability.

1.5 Sealability

The watertight seal on all ULTRA touchscreens allow it to meet NEMA standards 4 and 12, and IP standard 65.

1.6 Material Options

The following options are available for all ULTRA touchscreens:

1.6.1 Connector Options

Possible connector housings include latching or non-latching

1.6.2 Coversheet Options

Possible polyester types include clear, anti-glare, and anti-Newton ring. Possible armor glass coatings include clear and anti-reflective.

1.6.3 Substrate Options

Possible glass panel additions include EMI shielding, heater, PVB enhancement, and an additional chemically strengthened glass backing.

1.7 Advantages

ULTRA resistive touchscreens make for a cost efficient solution to most touch activation needs. ULTRA sensors are extremely resistant to many forms of punishment, including scratches and hammer blows or blows from other blunt objects, and will continue to function after suffering them. The sensors are extremely accurate, drift free when not in use, and are sealed against moisture and other outside contaminants. As an added safety feature, should the glass substrate break for any reason, the shards are held internally by the bezel and polyester/armor glass membrane which remains unbroken, protecting the user from harm. ULTRA provides a complete moisture barrier, which makes it ideal for very humid environments. Moreover, its watertight seal makes it ideal for NEMA housing applications.

The result is an extremely durable touch solution useful for almost any environment while always remaining accurate for the sensor's entire lifespan.

2. Performance Specifications

2.1 Input Method

Activation by finger, glove and stylus are all acceptable methods of using ULTRA touchscreens.

2.2 Activation Force

A minimum of 85 grams of pressure is required by a finger or gloved touch in order to produce an activation in the touchscreen. When not in use or being touched, the touchscreen will have no activations and no drift or constant touch will be observed.

2.3 Activation Accuracy

A touch registered by the controller will translate to a location within 0.098", or 2.5mm, on both X and Y axis of where the touch occurred on the touchscreen.

2.4 Sensor Lifespan

Over 60 million touches per point can be achieved thanks to ULTRA's layer of armor glass.

2.5 Surface Hardness

ULTRA's surface hardness is 6.5 Mohs.

2.6 Touchpoint Resolution

Touchpoint density depends on the controller used, but is typically 4096x4096, which corresponds to greater than 100,000 points/inch^2, or 15,500 points/cm^2.

3. Optical Specifications

3.1 Light Transmission and Reflection

Depending on whether or not the ULTRA touchscreen has an anti-glare or anti-reflective finish on its surface, the transmission and reflection rates will vary. All rates presented are using light of wavelength 550 nm.

3.1.1 Clear

On a clear ULTRA with no options, 82% transmission can be achieved and 9% reflection.

3.1.2 Anti-Glare

On an ULTRA with an anti-glare option, 82% transmission can be achieved and 9% reflection.

3.1.3 Anti-Reflective

On an ULTRA with an anti-reflective option, 84% transmission can be achieved and 9% reflection.

3.2 Gloss and Haze

ULTRA has a haze rating of 2% and gloss reading of 350 GU (clear).

4. Environmental Specifications

4.1 Operating and Storage Temperature

When in use, ULTRA will function accurately in environments ranging from -10°C to +55°C without suffering quality or performance issues. When not in use, ULTRA may be stored in environments ranging from -40°C to +70°C without suffering quality issues.

4.2 Relative Humidity

Relative humidity during operation is as high as 90% non-condensing at 35°C (max). Relative humidity during storage is as high as 90% non-condensing at 35°C (max) for up to 240 hours.

4.3 Chemical Resistance

ULTRA is impervious to all industrial specific and everyday chemicals, solvents and solutions that do not degrade or attack glass structure or quality, including detergents, cleaners, alcohols, oils and foodstuffs.

4.4 Immersion Resistance

The touchscreen features a watertight seal, allowing it to continue functioning while completely submerged.

4.5 Fire and Burn Resistance

ULTRA's surface is unaffected by open flame, sparks, cigarette burns, or other fire inducing objects or phenomena.

4.6 Altitude Resistance

ULTRA may be operated up to an altitude of 10,000 feet, or 3.048 km, and stored or transported at an altitude of 50,000 feet, or 15.240 km.

4.7 Vibration and Shock Resistance

The touchscreen can withstand repeated blows from blunt objects and will still function within specification parameters. When installed or placed in a suitable bezel housing, ULTRA stays in accordance with UL291 standard.

4.8 Impact Resistance

The touchscreen meets UL-60950 and CSA C22.2 no 60950 (0.5kg, 50mm diameter ball dropped from 1.3m height). For enhanced substrate touchscreens only.

4.9 Abrasion Resistance

ULTRA is impervious to scratches, gouges, and other surface abrasions and will continue functioning after suffering them.

5. Electrical Specifications

5.1 Electrostatic Discharge

Per EN 61000-4-2 (1995), ULTRA can withstand 20 discharges of up to 15 kV.

5.2 Corner to Corner Resistance

ULTRA has a corner to corner resistance of range 40-60 Ohms, depending on the size of the sensor.

5.3 Other Compliances

The overall sensor assembly is compliant with EN 60950, UL 60950, and UL 544.

6. Product Information

6.1 Warranty

ULTRA touch screens come with a 5 year warranty.