Forward Thinkers in Touchscreen Technology

ULTRA Technical Specifications for a 5-Wire Touch Screen

1181 Parisien Street
Ottawa, Ontario, K1B 4W4
Tel: 613-742-5545
Fax: 613-742-5245
Toll Free: 1-800-463-2353
Email: info@admetro.com
www.admetro.com

Table of Contents

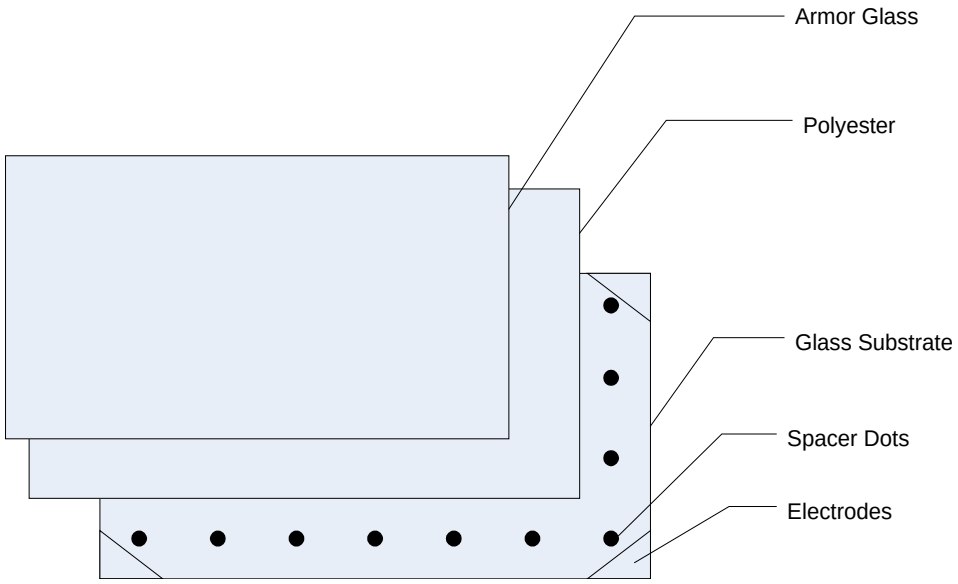
Revision History

Revision #	Description	Date
1.0	Initial Release	06/12/08
1.1	Change reflection/transmission specification	04/02/09
1.2	Change activation pressure specification	08/31/09
1.3	Change transmission, accuracy, resolution specifications	01/05/10

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 a conductive coating (Indium Tin Oxide, or ITO) with a uniform resistance across the surface of layers. 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.

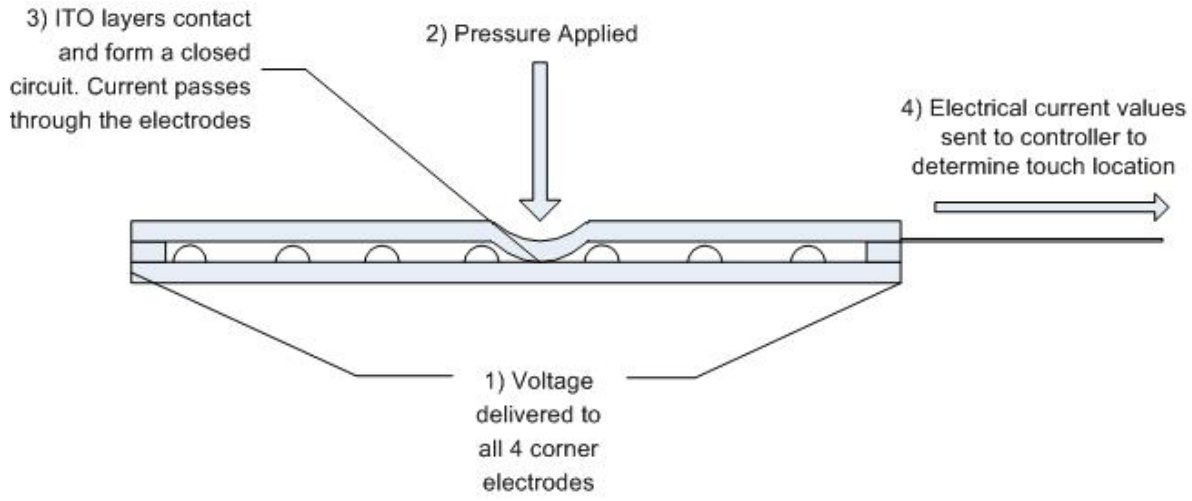


ULTRA touchscreens function identically to other five-wire resistive technologies but have the added bonus of a highly durable yet flexible armored glass layer to the surface polyester. It more than doubles a standard resistive touchscreen's lifespan by reducing the curve at which it the top glass/polyester layer will bend, resulting in a longer service period before the ITO coating begins crack from usage. The increase in pressure required for a touch 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 connected to the ground. 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 software to determine where the touch has occurred.



1.3 Connector and Cable Information

ULTRA touchscreens use polyester flex circuit cables constituting of five wires with centers 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 5 pin AMP type housing, with dock centers 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 treatments include clear, anti-glare 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, stylus and other pointed objects are all acceptable methods of using ULTRA touchscreens.

2.2 Activation Force

Maximum 80 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 2mm on both X and Y axis of where the touch activation occurred for sensors sizes up to 18.1". For sensors greater than 18.1", the error maximum is 1% of the sensor's active area diagonal dimension.

2.4 Sensor Lifespan

Over 230 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

ULTRA can support a touch point resolution of 4096x4096.

3. Optical Specifications

3.1 Light Transmission

ULTRA is available in several different configurations. Each configuration has varying optical characteristics depending on the type of polyester or armor glass finish the sensor has. All rates presented are using light of wavelength 550 nm.

3.1.1 Standard A/G ULTRA
(Anti-glare/anti newton ring treated polyester, clear amour glass)

The transmission is 84%.

3.1.2 Clear ULTRA
(No Anti-glare/anti newton ring polyester treatment, clear amour glass)

The transmission is 88%.

3.1.3 Surface Treated A/G ULTRA
(Roughened surface armor glass/anti newton ring polyester treatment)

The transmission is 81%.

3.2 Gloss

Clear armor glass ULTRAs have a surface gloss of 170-180 GU. Roughened surface armor glass ULTRAs have a surface gloss of 50-60 GU. Both are measured at 20°.

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 touchscreens come with a 5 year warranty.