



Sensata
Technologies

THERMOSTATS IN ARMORED GLASS



The World Depends on Sensors and Controls

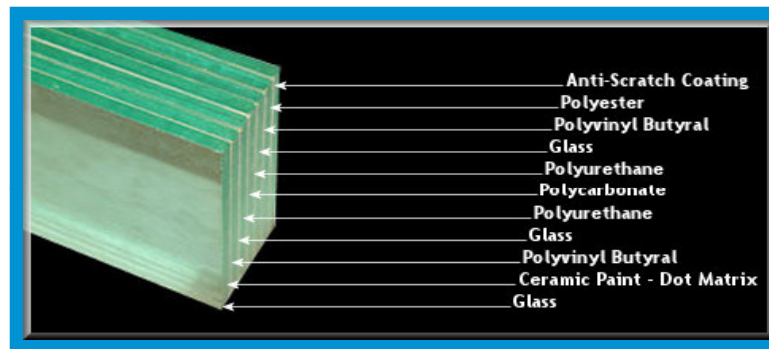


Introduction

Sensata Technologies offers a broad selection of styles for all aerospace, satellite, commercial & military aircraft, medical equipment, and HVAC markets. Our KLIXON® precision thermostats are designed for temperature protection or control in harsh environments. Utilizing a bimetal, snap acting disc as the thermal sensing element, KLIXON® precision thermostats feature exceptionally high reliability and long life. Standard configurations, probe style packages, or custom packaging can meet most design requirements. For instance controlling the heating of heatable armored glass in military vehicles.

Armored glass

Armored glass (also known as bulletproof glass, ballistic glass, transparent armor or bullet-resistant glass) is a type of strong but optically transparent material that is particularly resistant to being penetrated when struck by bullets, but like all known materials, is not completely impenetrable. Armored glass is usually constructed using polycarbonate, thermoplastic, and layers of laminated glass. The aim is to make a material with the appearance and clarity of standard glass but with effective protection from small arms.



Impact of polycarbonate by a projectile at temperatures below -7°C sometimes creates spall, pieces of polycarbonate that are broken off and become projectiles themselves. Experiments have demonstrated that the size of the spall is related to the thickness of the laminate rather than the size of the projectile. The spall starts in surface flaws caused by bending of the inner, polycarbonate layer and the cracks move “backwards” through to the impact surface. It has been suggested that a second inner layer of polycarbonate may effectively resist penetration by the spall.



It is vital to clearly see your way in every weather condition, even light fog and frost can reduce visibility. Heatable windows can de-ice and de-mist a window in less than 5 minutes at -10°C . The advantage lies inside the glass itself. Sinus shaped invisible wires or invisible coatings, either can efficiently remove ice or mist in the coldest temperatures. These armored glass heating solutions work effectively at about 18 - 24 Watts / square decimeter at 24 VDC and allowing more than 95% visible light transmission. To control the heating solution, thermostats are used. They are located against the armored glass to sense the temperature. Positive benefit is that using the heating solution in armored glass you avoid chance on the poly carbonate spall.

Features & benefits

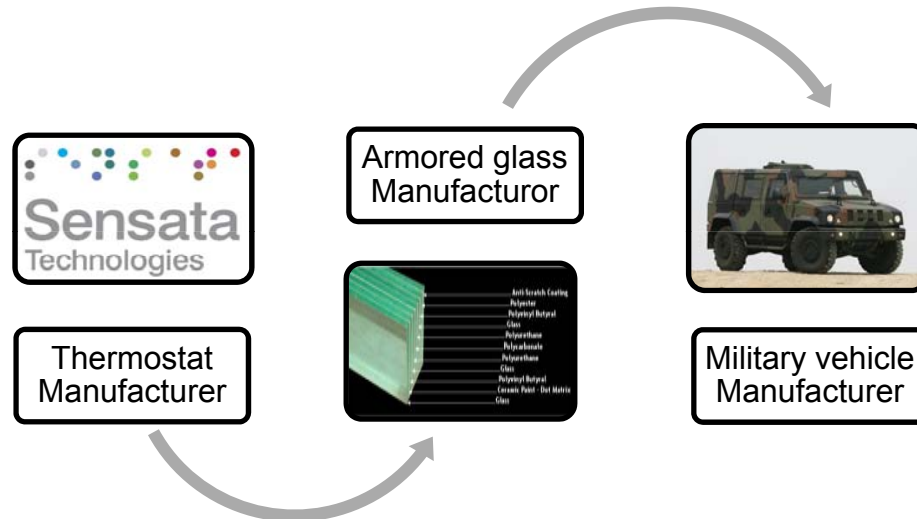
Key features of the precision thermostats are:

- Preset temperatures from -54°C to $+288^{\circ}\text{C}$
- Ratings: dry circuit to 15 Amps, 30 VDC or 120 VAC
- Hermetically and environmentally sealed
- Excellent vibration and shock resistance
- Qualified to MIL-PRF-24236
- UL, Canadian-UL and KEMA (ENEC) (7BT2 thermostat only) approvals
- Fast, snap-action switching
- Miniature size
- Pre-set, non-adjustable calibration
- High reliability, long life
- Custom packaging and value added services



Market

The supply chain applicable to the thermostats used on heatable armored glass is represented below. The armored glass design-in is normally performed by the military vehicle manufacturer. The decision maker for the thermostats can be found at the armored glass manufacturer.



Other applications for the KLIXON® thermostats

- Satellites
- Decoy flares
- Print Circuit Boards