Dischargers for all airborne applications

CHELTON

Static Dischargers

The main purpose of a static discharger is to improve the dispersal of accumulated aircraft static charges in an effort to reduce the resultant radio interference.

Location on the airframe enables them to serve a role as a lightning conductor and provide protection against arcing for the surrounding aircraft structure.

Static dischargers are replaceable and may be mounted on supports that are attached to the aircraft structure in such a way as to ensure adequate electrical contact.

Different types of static dischargers are used to alleviate different problems on various types of aircraft. This means a small general

aviation aircraft flying at lower speeds will not use the same type of device as a commercial airliner or business jet.

Static dischargers work on the principal of creating a relatively easy path for dissipating charges that build up on the aircraft using a device with fine metal points, carbon coated rods, or carbon wicks. Rather than wait until a large charge is developed and discharged off the trailing edges of the aircraft, a static wick will allow a small but constant stream of electrons to flow to the surrounding air. This process offers various decibels (dB) levels of static noise reduction, which can be adapted to different situations to eliminate interference in avionics equipment.

Aircraft charging will occur as an airplane flies through freezing rain, ice crystals, dust, sand, or snow. Contact with these particles leaves a charge on the airframe and as the charge builds, a potential is reached where the charge leaks off the aircraft and antennas, generating broadband radio

The Chelton Centre, Fourth Avenue, Marlow,
Buckinghamshire, SL7 1TF, UK
T: +44 (0)1628 472072
E: info@chelton.com
W: chelton.com

Dischargers for all airborne applications

CHELTON

frequency noise. This interferes with ADF, HF, as well as VHF and VOR receivers.

Location on the airframe enables dischargers to serve a role as a lightning conductor and provide protection against arcing for the surrounding aircraft structure.

Streaming is a type of noise generated by nonconductive devices such as radomes, fibreglass winglets, and other non-metal panels positioned on front impact areas of the aircraft. As particles strike, they deposit an electron on the dielectric surface. As more particles impact, the voltage increases until it reaches the flash over point. When the charge flashes over the surface of the dielectric material, it generates broadband radio frequency noise.

Corona noise occurs when the aircraft accumulates sufficient charge due to aircraft charging and ionizes the air around wing tips, vertical and horizontal stabilizers, and other protrusions. More than 500,000 volts have been measured on general aviation aircraft in flight.

As current bleeds from the trailing edges radio frequencies are produced that sound like loud hissing in aircraft receivers. The charging may also cause antennas to go into corona (bleed off charge). When this happens, the noise appears like a strong signal to the receiver. In some cases, the automatic gain control circuit, sensing noise as a strong signal, desensitizes the receiver

to the point where the radio may go perfectly quiet. The pilot assumes no one is calling, but in reality, corona current has shut down the receiver.

Solutions to corona noise include antennas that are insulated and static dischargers positioned where the aircraft is most likely to go into corona; wing tips, vertical and horizontal stabilizers are examples. Static dischargers bleed off charge quietly. They lower aircraft voltage build up below a level where antennas go into corona.

Arcing noise interference is generated by an isolated piece of metal situated on an aircraft where, as the aircraft charges, it reaches a potential at which a spark jumps the gap from aircraft structure to isolated metal. The spark can produce broadband noise extending through 1,000 MHz. The solution is to locate the isolated metal and bond it to the aircraft structure with a grounding strap.

The Chelton Centre, Fourth Avenue, Marlow,
Buckinghamshire, SL7 1TF, UK
T: +44 (0)1628 472072
E: info@chelton.com
W: chelton.com

Dischargers for all airborne applications

CHELTON

Optimum Performance

When considering the whole low life-cycle costs the unit price is only the beginning of the cost per flight hour. Oftentimes the labour to replace defective dischargers significantly outweighs the unit cost, making reliability extremely important.

Inefficient dischargers may mean costly troubleshooting and premature replacement, which adds to maintenance hours and costs. By using Chelton dischargers, maintenance is reduced due to their exceptional lifespan and reliability.

By controlling each step of the research and development and manufacturing process, Chelton assures that the quality of design is maintained and installed dischargers operate at maximum efficiency.

Noise Reduction

Chelton Static Dischargers are intended to reduce or eliminate 'P-Static' noise interference on aircraft radio receivers operating principally in LF/MF/HF and VHF.

- Both carbon tips and nichrome wire tips have low electrostatic thresholds to ensure the quietest possible discharge
- Chelton dischargers provide greater or equal to 60dB noise quieting at LORAN, Omega and ADF frequencies when compared to an unprotected airframe

Wide Variety

Chelton discharger bases are designed to fit any mounting points on the aircraft, and those with ASA-3 mounts can be retrofitted to aircraft and helicopters with older style static wicks.

To prevent electrolysis, the alloys used in dischargers and retainers are compatible with materials used on both civil and military aircraft.Special dischargers designed for supersonic aircraft stay mounted even at Mach 2+ and attach to the trailing edge with minimum drag increase.

Special Applications

Chelton custom designed dischargers are known for their ability to stay on the aircraft during high speed, high "g" flight, and applications have included the Concorde, B-1B and F-16 supersonic aircraft, as well as corporate jets and UAV's, each with drastically different 'P-Static' parameters. Chelton has also developed special mounts and retainers which exceed manufactures' specifications for performance, reliability, cost and longevity.

Interchangeability

Chelton dischargers are fully interchangeable with all discharger manufacturers worldwide

The Chelton Centre, Fourth Avenue, Marlow,
Buckinghamshire, SL7 1TF, UK
T: +44 (0)1628 472072
E: info@chelton.com
W: chelton.com

Dischargers for all airborne applications

CHELTON

Quality Assurance

Chelton dischargers meet stringent U.S. MIL-D9129D requirements and are designed, built and tested to appropriate MIL-I-45208, ISO 9000, FAA and CAA standards.

Nichrome Wire Tips

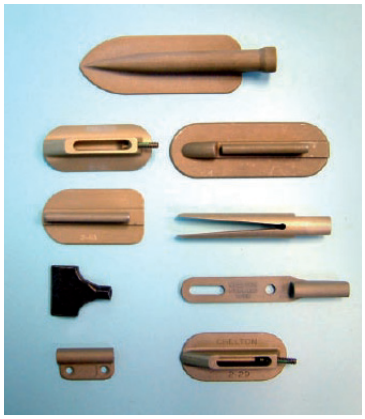
Earlier Miniprobe designs use a multiplicity of fine Nichrome wires at the point of discharge. These designs have the advantage of a very low threshold potential but at low RF frequencies (below 1 MHz), provide some 10dB less noise quieting than Miniprobe 'composite tip' designs.

Composite Tips

Composite tip designs, which are recommended for all new installations, use a semi-conducting tip at the point of discharge in place of the Nichrome wires. Extensive testing and use has shown that these designs have maximum noise quieting with a threshold potential fractionally above that of the Nichrome wire tip designs.

Retainers/Bases

- Bases are compatible with all types of dischargers
- Mixture of lightweight materials which also minimizes corrosion
- Can be bonded to composite structures
- Mounting bases can be used on any type of aircraft



Discharger Test Set

- Test Set QB18 is a hand-held insulation tester intended specifically for all essential in-service static dischargers•
- It is designed for resistance checks on all current types of aircraft dischargers
- Comes complete with a set of test leads

High Resistance Straps

- Designed to control flow of current from adjacent surfaces to main airframe
- Used between control surfaces, flaps, landing gear doors and fin flaps

The Chelton Centre, Fourth Avenue, Marlow, Buckinghamshire, SL7 1TF, UK
T: +44 (0)1628 472072
E: info@chelton.com
W: chelton.com