

Time Delay Electronic Safe, Arm and Fire Device



communications
Electrodynamics, Inc.



FEATURES

- Acquires data on BIT disconnect, guidance and acceleration simultaneously
- Digital double-integration of acceleration
- Remains safe until safe separation distance is achieved, via integrator and backup timer
- Serial interface for good-guidance input
- Sequence-checking on all environments
- High voltage arming from 28 VDC
- Trigger Switch interface and timer for precision delayed firing
- Exploding foil initiators using HNS-IV for high insensitivity
- BIT for safety verification
- Meets Army and Navy ESAF guidelines
- Passed qualification tests
- Lightning and ESD tests
- 2.25" UN thread
- Convection cooling
- 100% ESS on all units
- GSE available for test

The L-3 Communications, Electrodynamic (L-3/EDI) Time Delay Electronic Safe, Arm and Fire (TD-ESAF) device receives key vehicle, subsystem and environmental parameters from a missile, and validates them to safe, arm and fire two high explosive outputs. The ESAF device computes safe separation distance from internal acceleration sensors to determine the arm distance. A high-voltage DC-DC converter arms the fireset. The ESAF device is triggered on impact and can penetrate soft targets. A timer circuit delays the input trigger and produces a time-delayed fire signal to initiate the output. The ESAF device was developed for the Hellfire II Missile System and can be easily adapted to other vehicles.

The ESAF threads into the warhead and is suitable for use in a bomb, missile or undersea environment. It contains environment sensors, safe/arm logic, a high-voltage DC-DC converter, electronic time delay, and one Exploding Foil Initiator. This highly reliable unit has no moving parts or adjustments.

The validation function receives and checks signals for all environments simultaneously, enabling arming on proper sequence and time windows while also detecting complex disarm/dud conditions.

Selectable/programmable time delays can also be implemented.

Unit built-in test is performed on power-up and results are reported to the missile.

A telemetry interface is provided for tests. The unit will cool itself by convection. The modular design of the ESAF permits easy reconfiguration to new applications. The basis for the TD-ESAF design is the Hellfire II ESAF. Over 16,000 of these units have been delivered through May 2000.

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DESIGN

MIL-STD-331—fuse testing
MIL-STD-454—general
MIL-STD-461—EMI
MIL-STD-704—air vehicle power
MIL-STD-810—environmental test
MIL-STD-1316—fuze safety
MIL-STD-1385—HERO
MIL-I-23659—initiators

SPECIFICATIONS

Size: 5.5" dia. x 1.05" thick (main)
1.92" dia. x 2.85" long threaded extension
(time delay/fireset module)

Color: Natural metal color

Penetration: steel or masonry

Weight: 800 grams

Power: +15 VDC @ .75 watts and
+28 VDC @ 33 watts (arming only)

Output: Initiates PIC or booster directly

Delays: microseconds to milliseconds

Reliability: 0.998 (initial) 0.984 (10 years)

Life: 120 hours operating, 10 years useful

