

Inductive Settable Electronic Time Fuze for Mortars

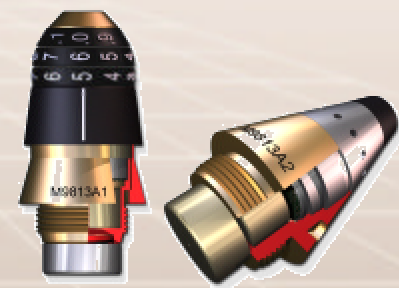
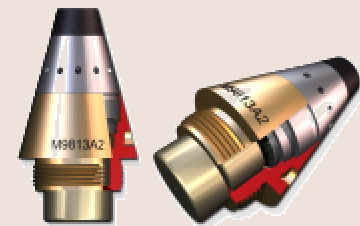


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Disadvantages of Conventional Mortar Time Fuzes

- ◆ Second environment sensor – Pull wire
- ◆ Not compatible with autoloader systems
- ◆ Timing inaccuracy – especially at temperature extremes
- ◆ External lighting source required at night
- ◆ Ballistic range changes due to profile
- ◆ Excessive time required for setting
- ◆ Special tools required for setting

Design Objectives for a new Mortar Time Fuze

- ◆ Compatible with all 60mm to 120mm mortar systems
- ◆ Inductive time setting within 1.5 seconds
- ◆ Settable from 5.0 to 199.9 sec in 0.1 sec steps
- ◆ Time read-back facility
- ◆ Time accuracy better than 100mS
- ◆ External profile compatible with DM93 fuze
- ◆ Impact Backup Mode
- ◆ Use of two independent timers
- ◆ Overall Reliability >99%
- ◆ STANAG 4157 / 4187 Compliant

Inductive Set Mortar Time Fuze – MTF01

- Characteristics
 - Based on well proven proximity fuze M9327
 - Turbine Generator Powered
 - No Stored Electrical Energy
 - Inductively Set
 - STANAG 4369 Based protocol
 - Supports inductive “readback”
 - Settable 5.0 to 199.9 sec in 0.1 s steps
 - Microprocessor based electronics
 - ‘Flash’ Microprocessor Technology
 - Indefinite memory retention
 - Dual Independent Timers
 - Timing accuracy better than 100ms
 - Electronic Safety time 4.0 sec



- MTF01 Characteristics – Continued

- Electronic Superquick Impact Backup
- Safe and Arm Device:
 - 180° Out of line when safe
 - Turbine Driven Reduction Gearbox
 - Dual Environments:
 - Setback
 - Airspeed
- Turbine protected against overspeed
- Black Powder Pyrotechnic Charge
- Waterproof nose cover for storage
- Fuze Mass (Nominal) 375gr



Inductive Set Mortar Time Fuze – MTF01

Programming Coil

Turbine Generator

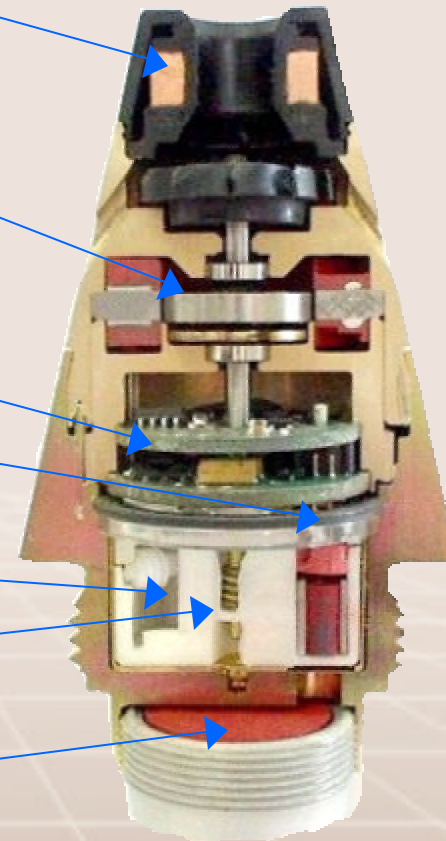
Timer Electronics

Electric Detonator

Impact Switch

Safety and Arming Device

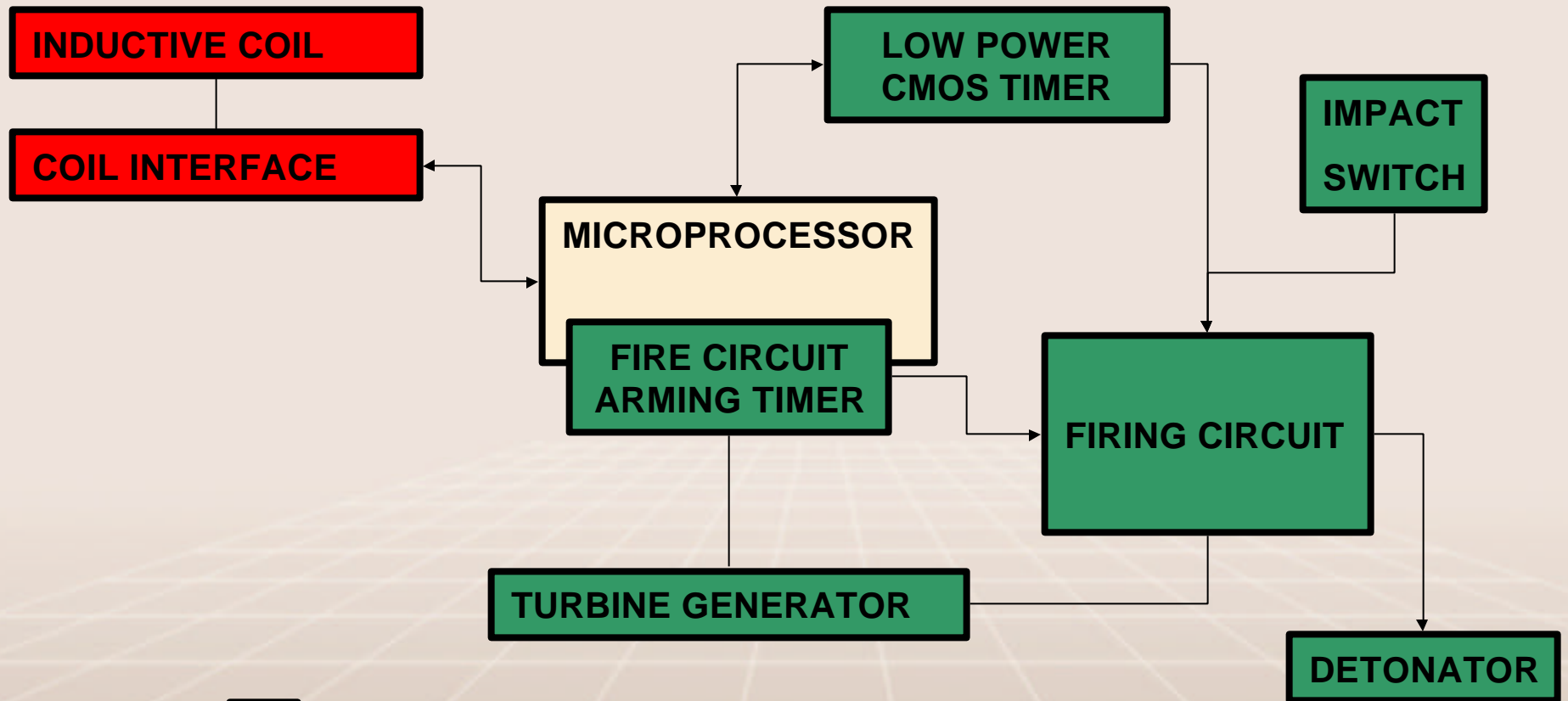
Expulsion Charge



Design Challenges

- ◆ Fitting of turbine generator and SAD into the available space.
- ◆ Design of electronics to operate near apex on low charges.
- ◆ Inductive coil dimensions and position
- ◆ Timebase Circuitry:
 - Accuracy
 - G-Hardeneing
 - Independent Timer
- ◆ Calibration of the electronics via inductive interface

MTF01 – Functional Block Diagram



KEY :



= USED IN ALL MODES



= USED BEFORE FIRING ONLY



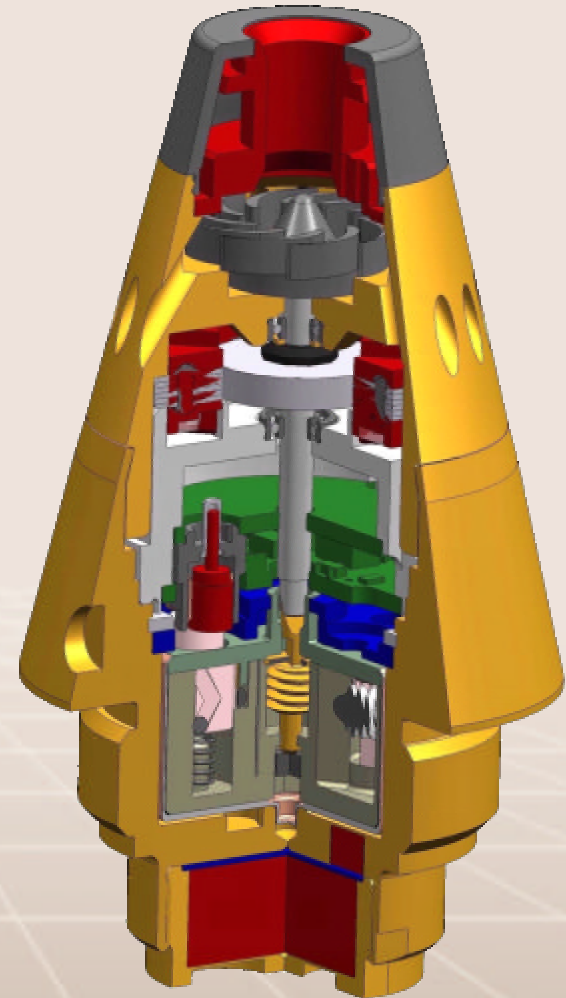
= USED IN FLIGHT ONLY

Operational Limits

	Minimum	Maximum
Temperature	-46°C	+63°C
Acceleration	600g's	18 000g's
Muzzle Velocity	65m/s	480m/s
Terminal Velocity	60m/s	480m/s
Mechanical Safe Distance	60m	
Electronic Safe Time	4 sec	
Time Function		
Time Setting	5.0 sec	99.9 sec
Accuracy	Better than 100 ms	
Point Detonating Backup Function		
Impact Angle	20°	90°
Deceleration	100g's (3ms)	

Status

- ◆ Successful dynamic firings on various charges and mortar weapon systems in South Africa.
- ◆ Successful firings on an autoloading 120mm dual barrel "mortar under armour" system.
- ◆ Design is ready for production

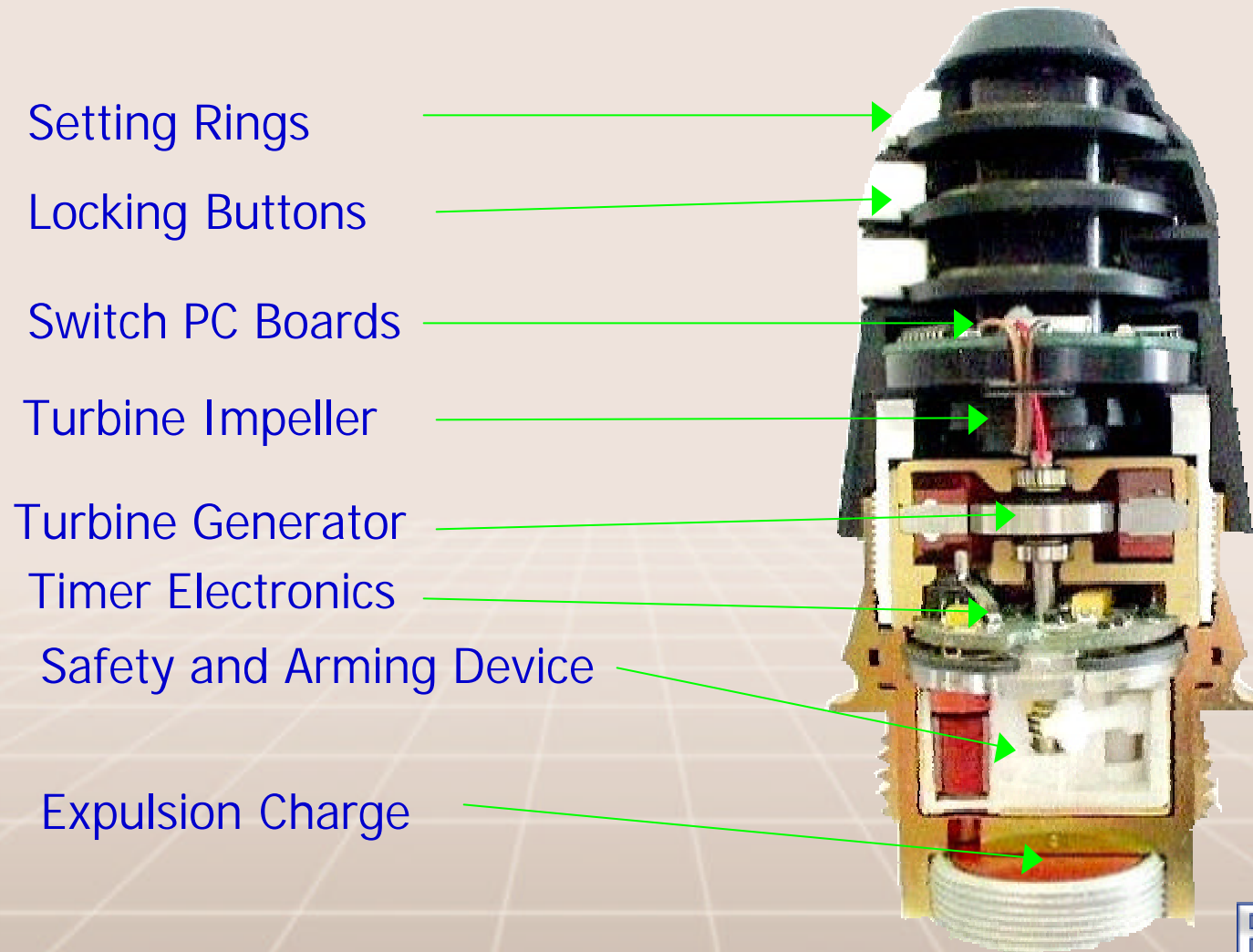


Hand set Mortar Time Fuze - M9813

- Hand settable electronic time fuze
 - Settable 4.0 to 99.9 sec.
- Usable on 60mm, 81mm, 120mm Mortar
- Similar “building blocks” to MTF01
 - Turbine generator/SAD
 - Electronic timer
- Electronic super quick impact mode backup
- Mass 350g nominal

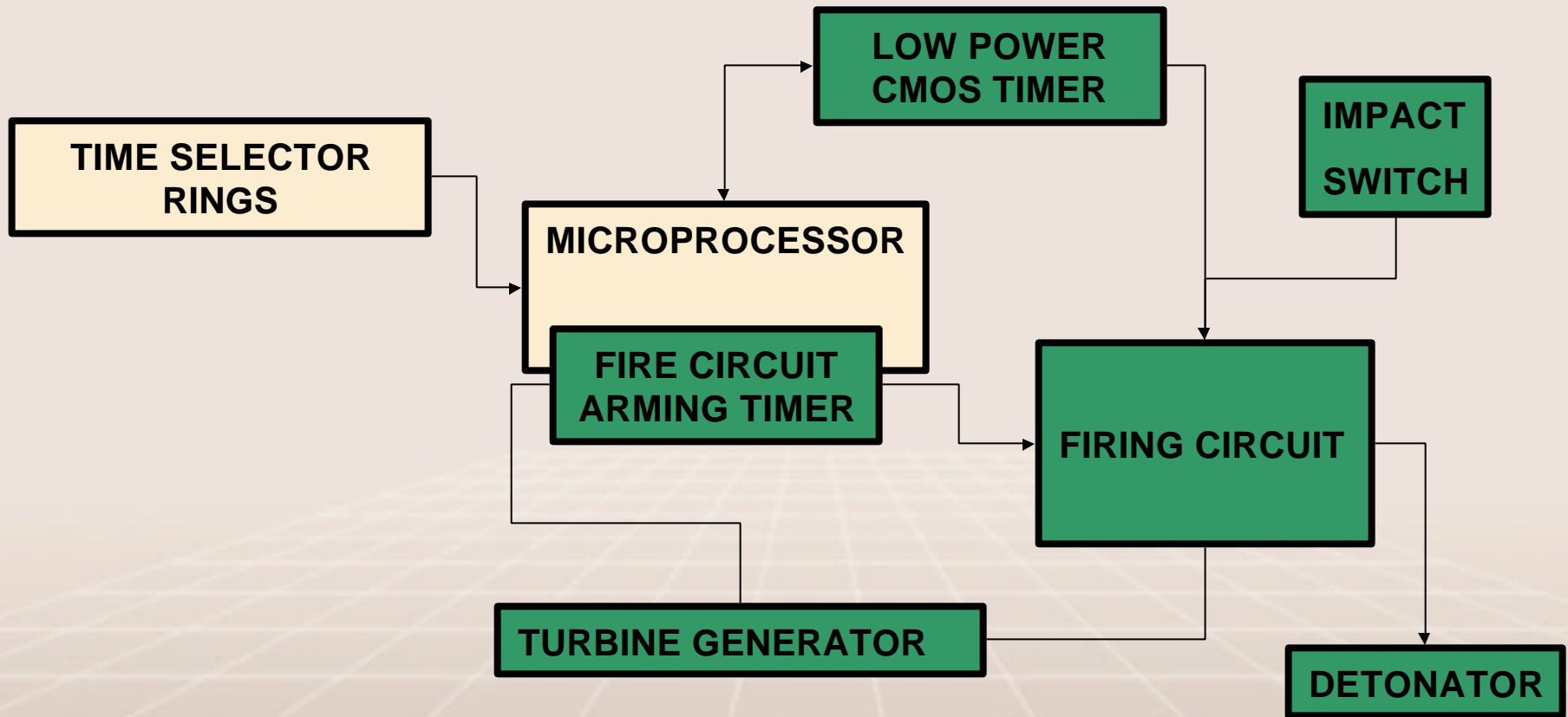


M9813 –Physical Characteristics



M9813 – Hand Settable Fuze

Functional Block Diagram



KEY :



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Inductive Setters for Mortar Time Fuzes

Option 1 – M22 Handheld Setter

- STANAG 4369 setter modified for mortar fuzes
- Battery operated
- Handheld
- Supports Read Back



Inductive Setters for Mortar Time Fuzes

- ◆ Option 2 – FS 2000
 - Designed for M109 Howitzer
 - Can be customised for Mortar under Armour
 - Serial interface to Fire Control Computer
 - LED Alphanumeric Display
 - Two Colour LED Indicator of Setting status
 - Keypad for Manual data entry

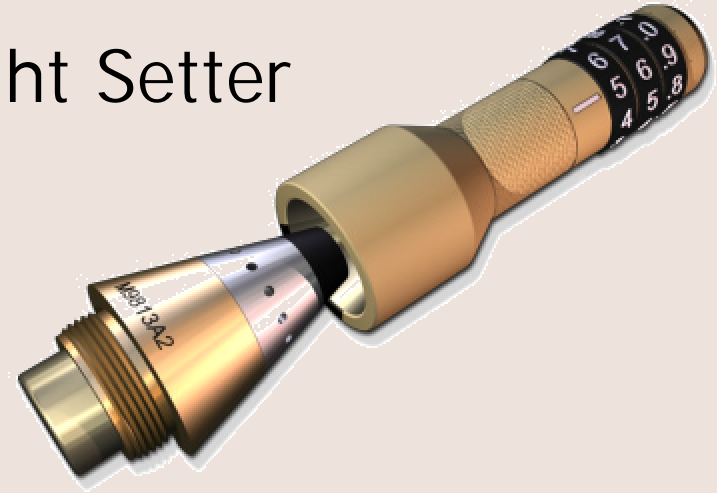


FS 2000 – Integrated Fuze Setter



Inductive Setters for Mortar Time Fuzes

- ◆ Option 3 – (Future) Flashlight Setter
 - Pocket Size
 - Battery operated
 - Handheld



- ◆ Option 4 – Fully Automatic Custom setter design

Conclusion

- ◆ The MTF01 Completes Fuchs Electronics' lineup of Electronic Time fuzes for Mortar and Artillery applications

