

# 49th Annual Fuze Conference

JUNGHANS Feinwerktechnik

**Presentation for the NDIA's 49th Annual Fuze  
Conference 2005 (Seattle, WA)**

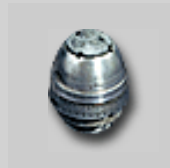
**Presented by Jochen Wagner & Martin Leonhardt**



# JUNGHANS - History



**1861** - Founded by Erhard Junghans



**1905** - Start of fuze production



**1957** - Takeover by Diehl

## Diehl-Group

Family owned since 1902

Sales: 1,6 billion €, Employees: 10.600

**DIEHL**  
VA Systeme



# JUNGHANS - Product Range



## Mechanical and Electronic Fuzes for:

Mortar ammunition

Rockets

Tank ammunition

Anti-tank ammunition



Artillery ammunition

Medium calibre ammunition

Submunition

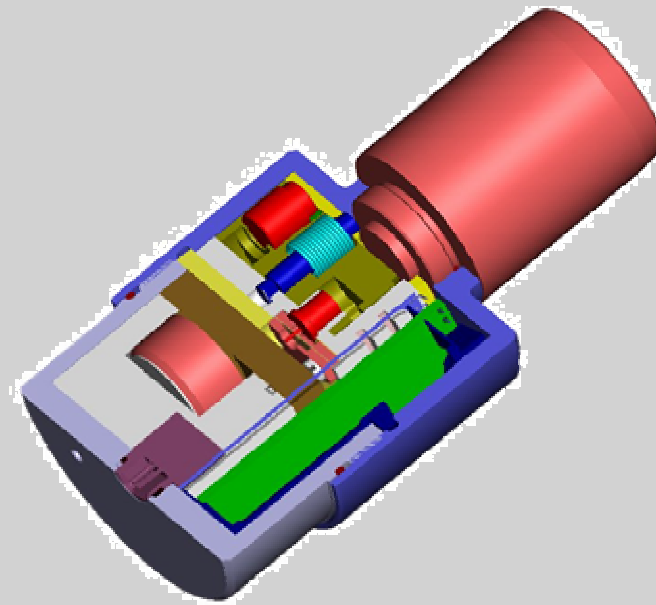
...and Safety and Arming devices



# Fuze for the new programmable Cartridge

120mm x 570 HE

(Point Detonating / Airburst / Self Destruct)

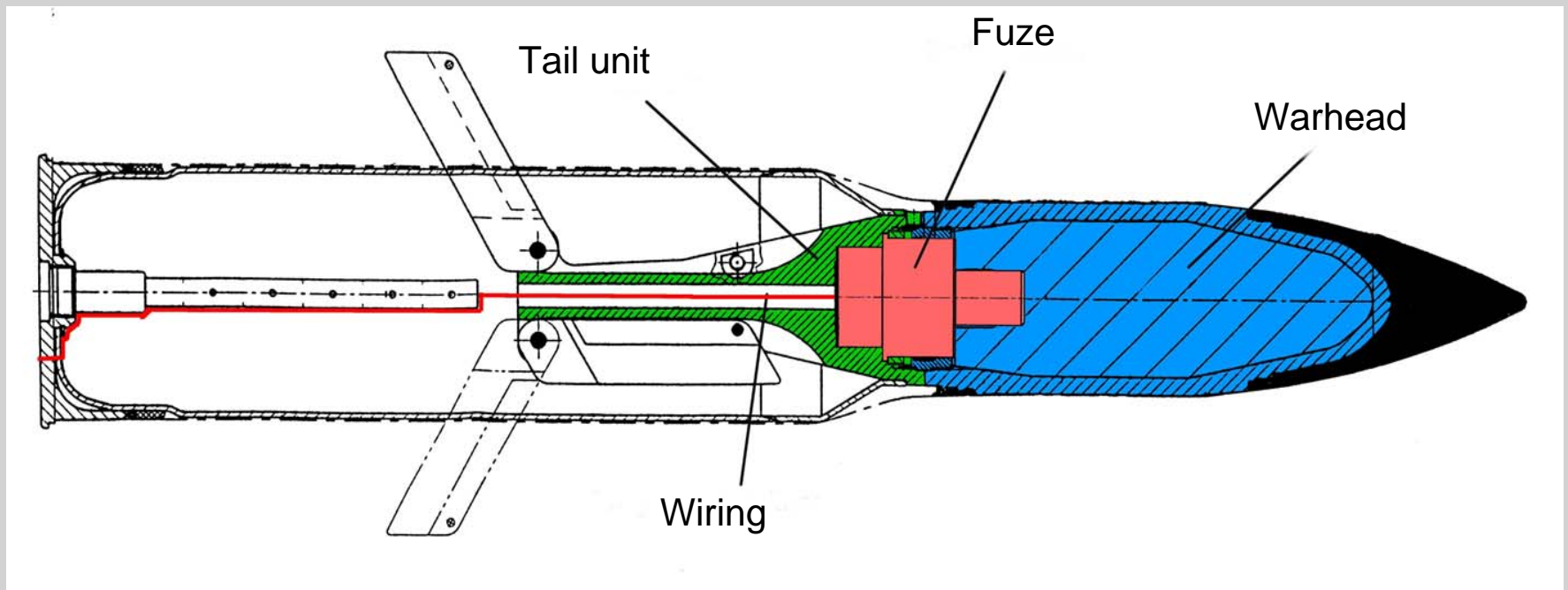


# Applications

- 120mm smoothbore Tank Gun



# Cartridge



# Requirements (1)

## Functional Modes

- **Programming**

- Impact Super Quick
- Impact with Time Delay
- Time (Airburst)

- **Back-Up**

- Self Destruction

- **Basic Function (without Programming)**

- Impact Super Quick
- Self Destruction (optional)



## Requirements (2)

- **Design and Safety Requirements in accordance with STANAG 4187 and MIL-STD 1316**
- **Environmental Tests in accordance with MIL-STD 331 and MIL-STD 810**
- **Muzzle Safety Distance  $\geq 20\text{m}$**
- **Arming Distance  $\leq 80\text{m}$**
- **Reliability Rate over all Modes  $\geq 98\%$**
- **IM in accordance with STANAG 4439**





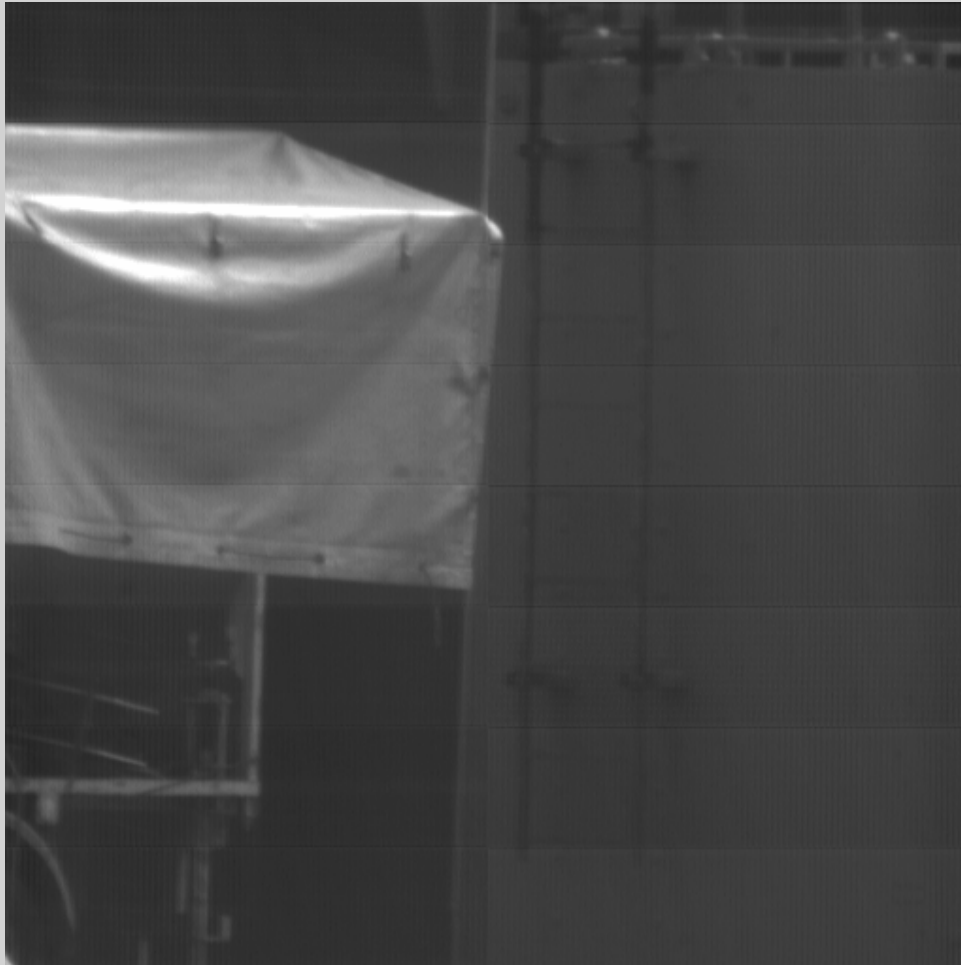
## Requirements (3)

- **Following requirements are generally fulfilled:**
  - STANAG 2895
  - STANAG 4235
  - STANAG 4239
  - MIL-STD 1385
  - VG 95211
  - VG 95287



# Firing Trails

- Flight Phase of the Projectile



Many thanks to  
Rheinmetall for the videos



# Firing Trails

- PD Function



# Firing Trails

- Airburst



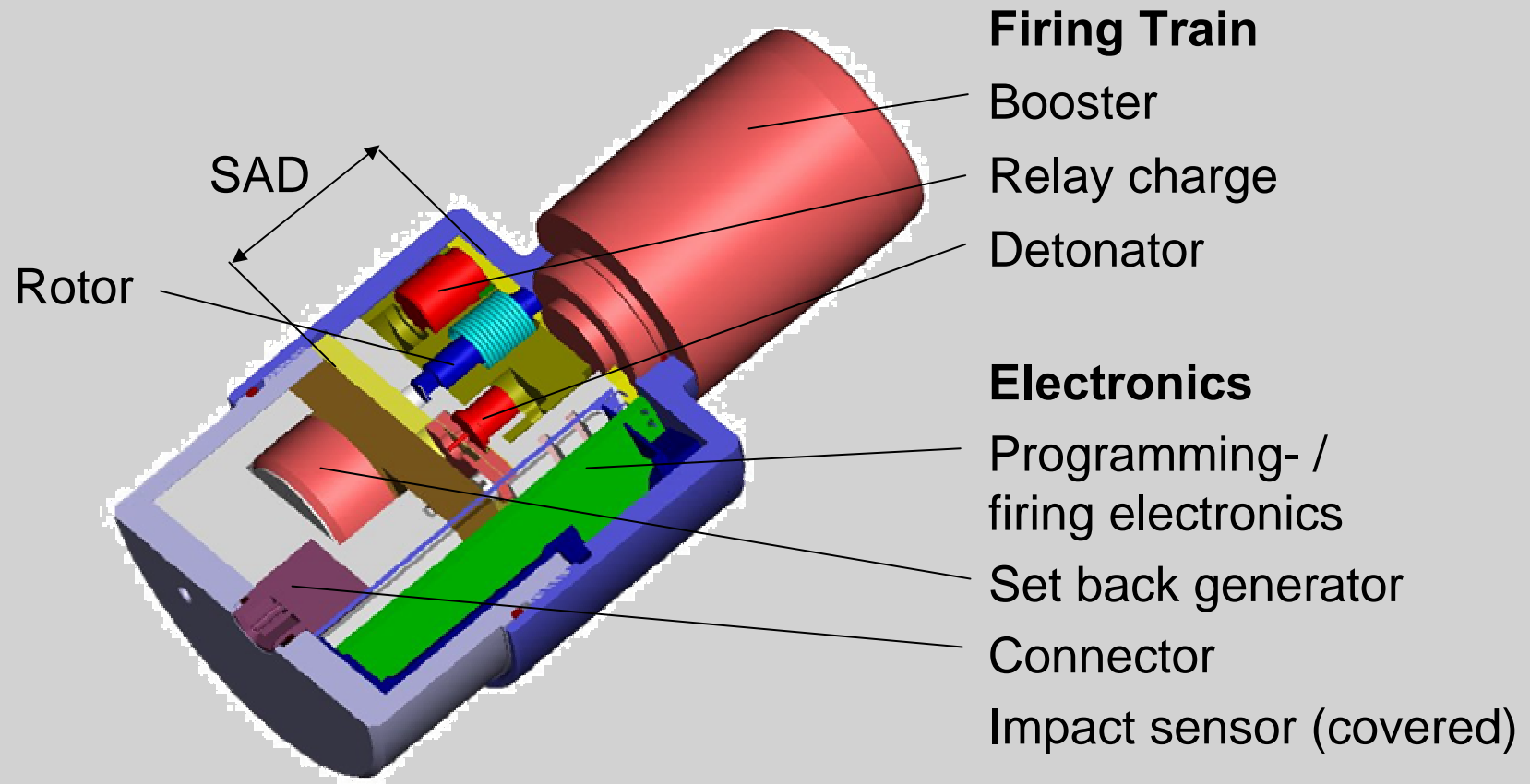
# Firing Trails

- Target Arena after the Airburst





# Main Components



# Solution (1)

## • First Safety Criterion

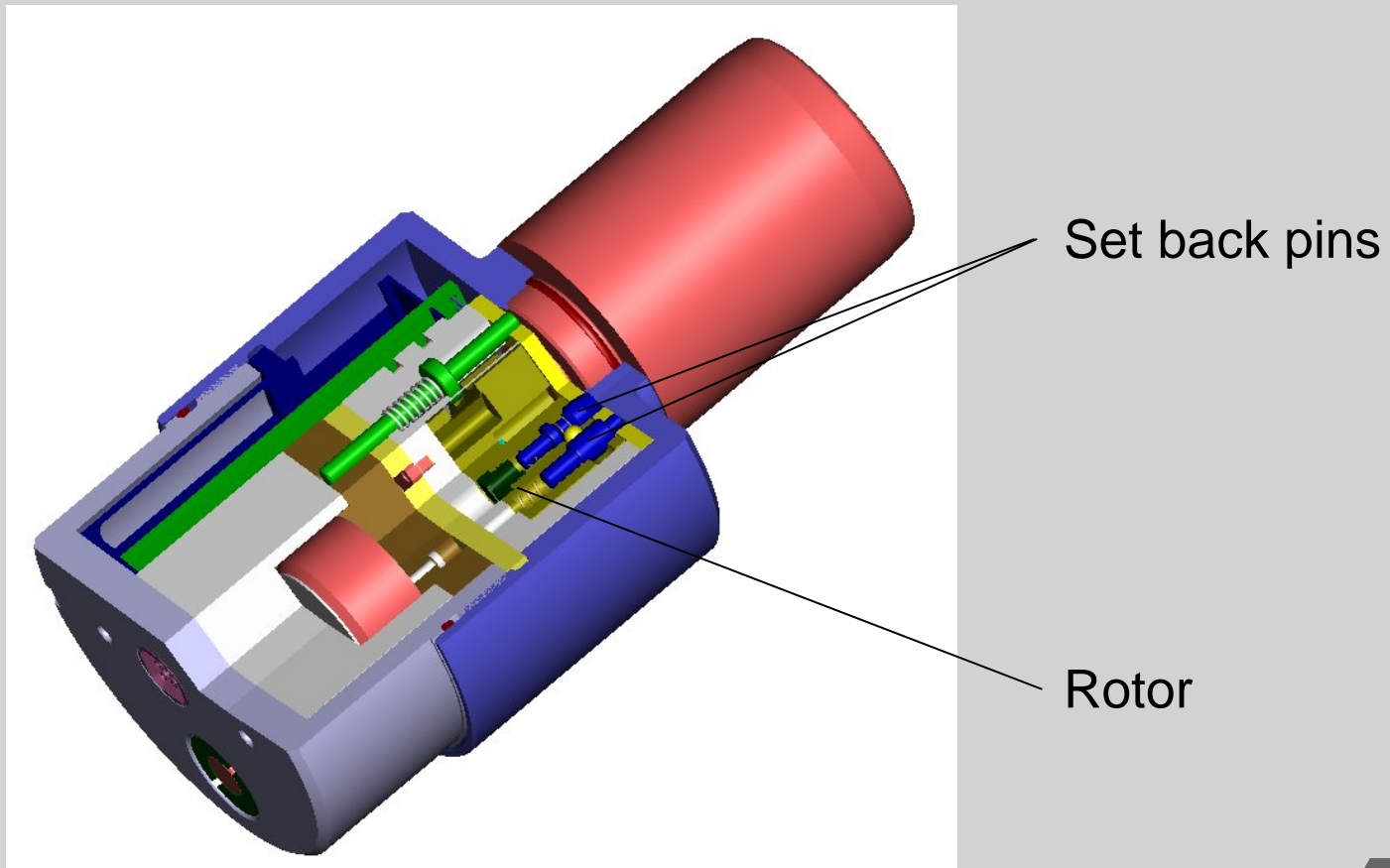
- Safety element: Set back system
- Arming criteria: Acceleration

## • Second Safety Criterion

- Safety element: Piston actuator in combination with time and firing circuit and a gas pressure switch at the tail unit
- Arming criteria: Gas pressure

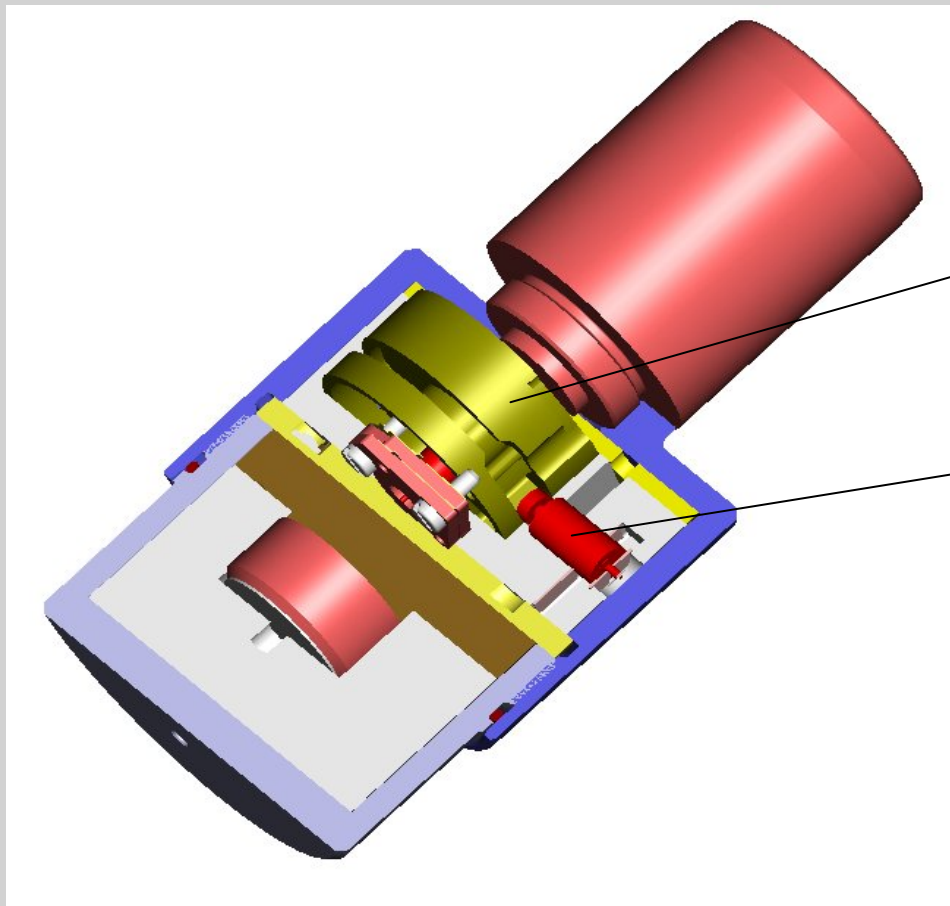


# First Safety Device





# Second Safety Device



Rotor

Piston actuator



## **Solution (2)**

- **Safety Distance**

- Ignition pulse for the piston actuator after muzzle safety distance

- **Programming**

- Digital programming
- Talk back after programming
- Continuous programming up date

- **Power Supply**

- For programming from the control unit via wiring
- For the basic function from the set back generator of the fuze



## Solution (3)

- **Impact Sensor**

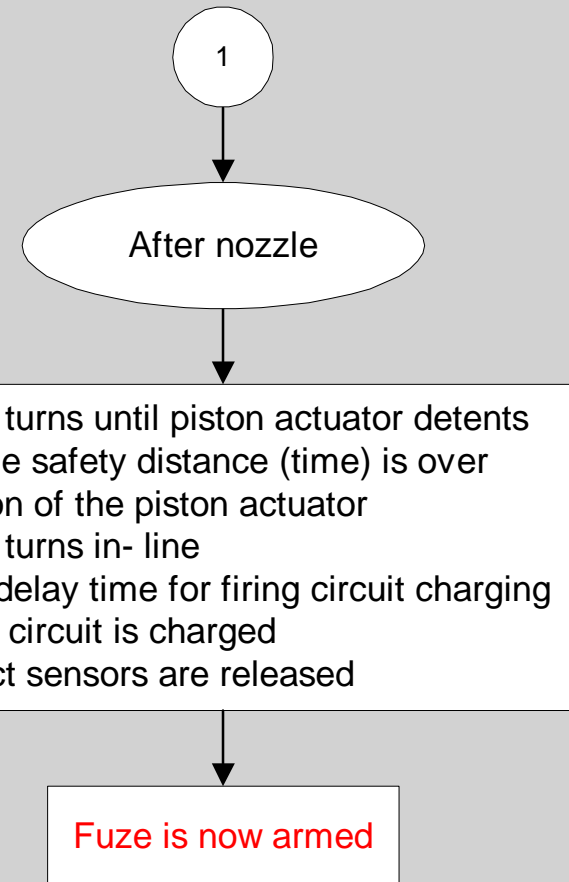
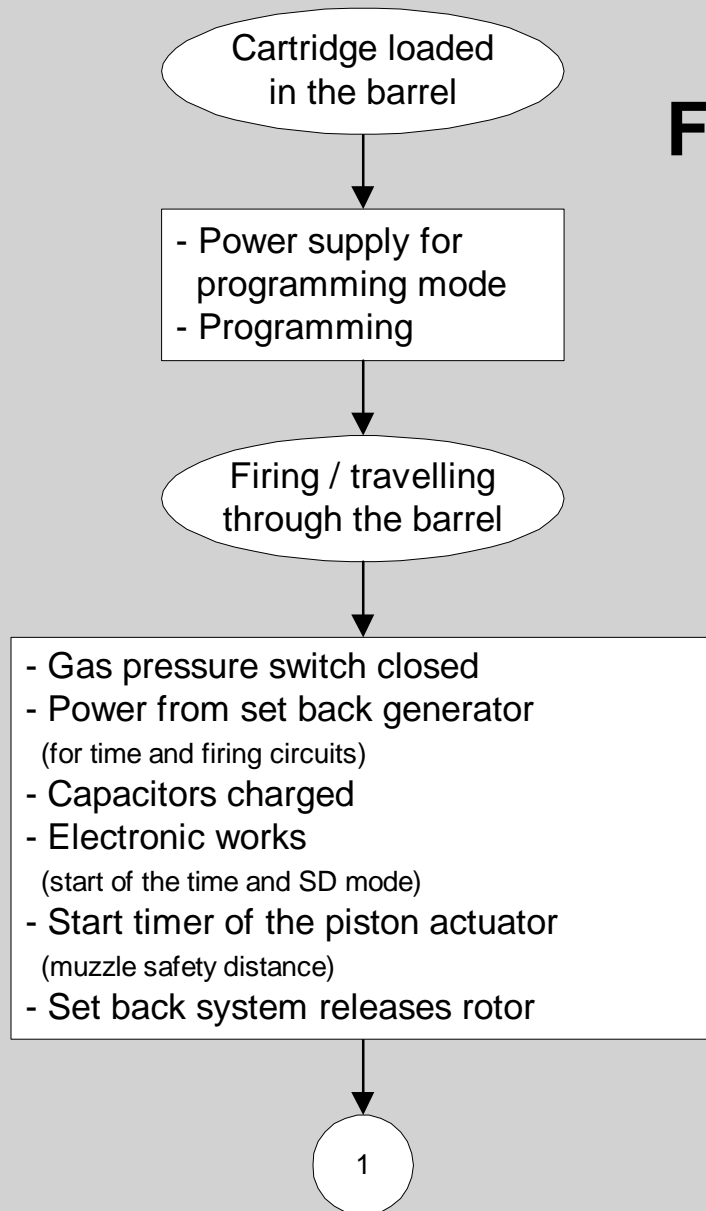
- Shock wave sensor (Piezo)
- Inertial switch (G- switch)

- **Connector**

- Gas pressure switch connection
- Fire control unit connection

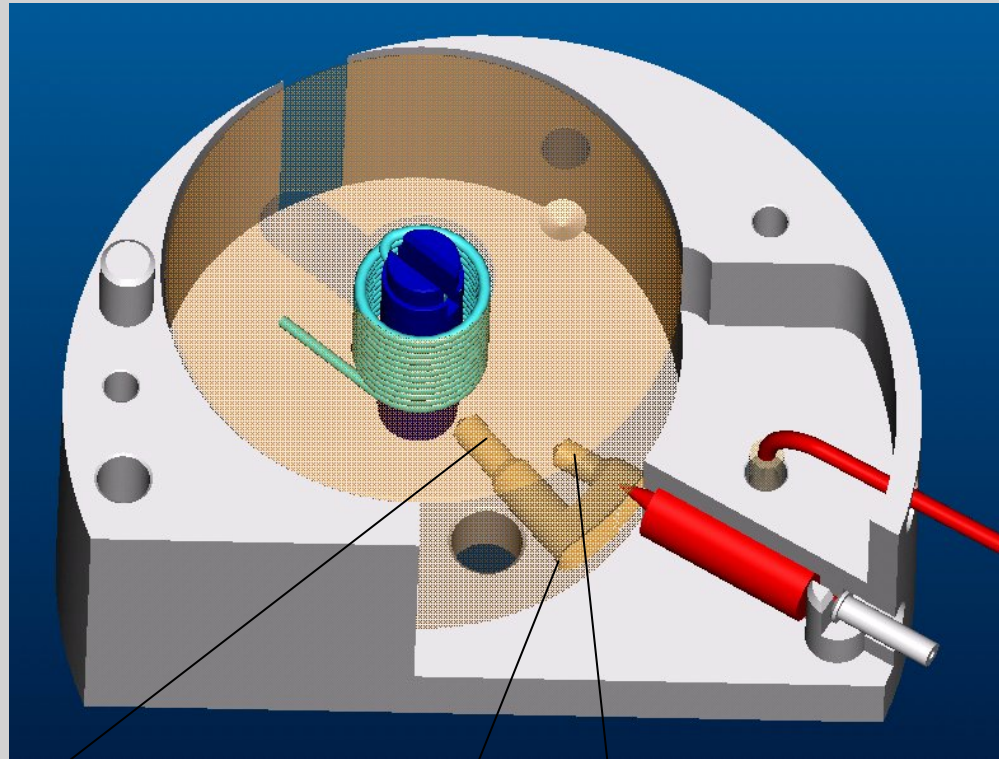


# Functional Diagram



# Functional Description (1)

- **Unarmed Position**



Hole for the pin of the piston actuator: For releasing the rotor

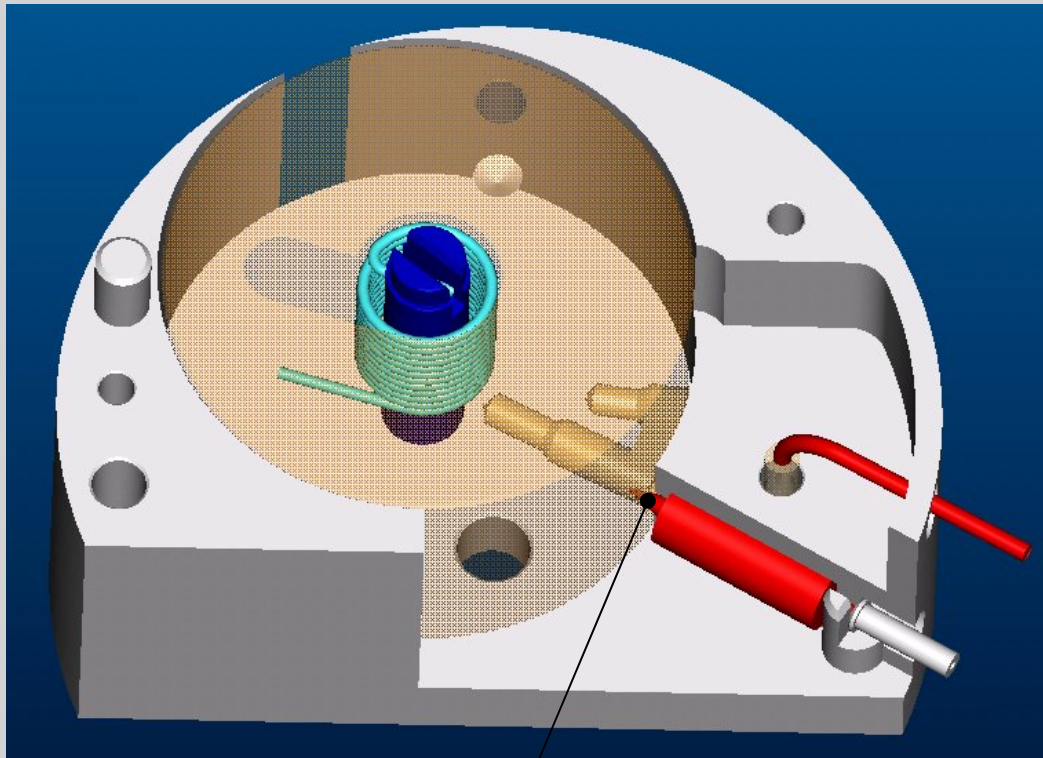
Limit stop for the piston actuator

Hole for the pin of the piston actuator: To secure the rotor in unarmed position



## Functional Description (2)

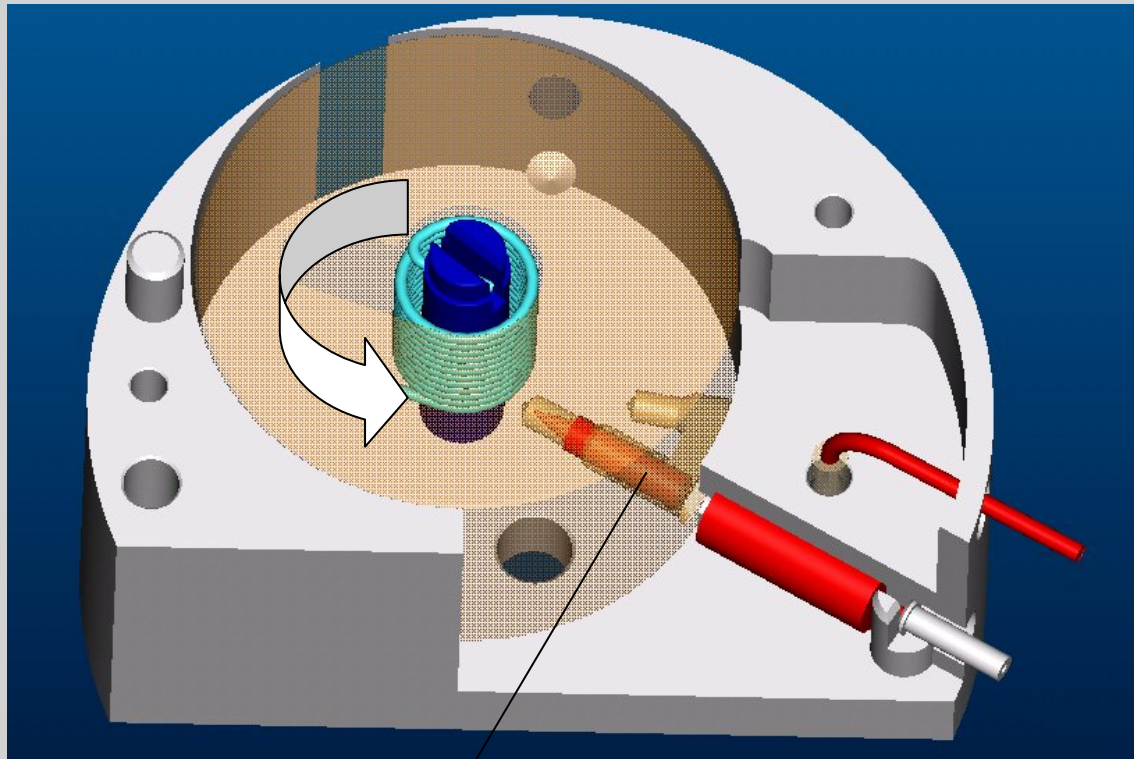
- 1st Step of the Arming Process



Limit stop for the piston actuator (Rotor turns about  $18^\circ$ ), pin stops further arming

## Functional Description (3)

- 2nd Step of the Arming Process

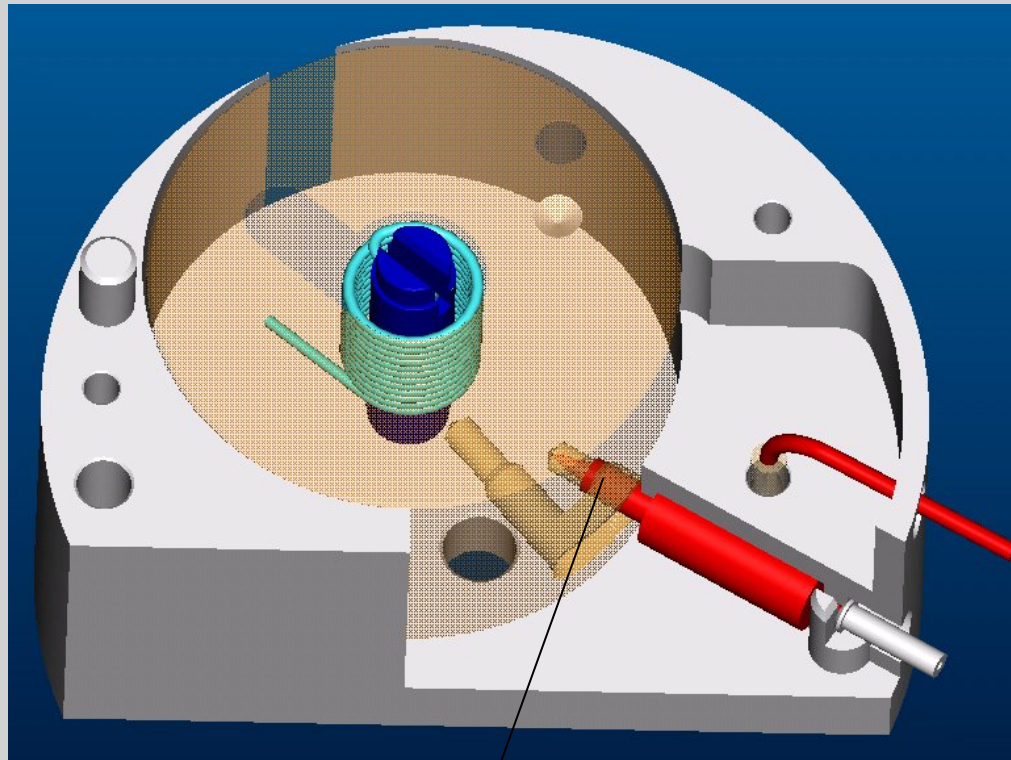


Pin of the piston actuator fired  
into the hole. Rotor turns in- line



## Functional Description (4)

- **Malfunction: Piston Actuator fired in Safe Position**



Pin of the piston actuator fired into the short hole. Rotor fixed in unarmed position



# Schedule

- **Development**

- Company qualification until the end of 2005

- **Qualification**

- Qualification by the BWB in 2006

- **Mass Production**

- EMD in 2006 / 2007
- Start mass production end of 2007 / beginning of 2008



# Firing Trails

- Airburst



# Points of Contact

JUNGHANS Feinwerktechnik

Geisshaldenstrasse 49

D- 78713 Schramberg

Jochen Wagner (Sales Department)

Phone: +49 7422 18 492

Fax: +49 7422 18 400

Email: [jochen.wagner@junghans-fwt.de](mailto:jochen.wagner@junghans-fwt.de)

Martin Leonhardt (R&D)

Phone: +49 7402 181 75

Fax: +49 7402 181 32

Email: [martin.leonhardt@junghans-fwt.de](mailto:martin.leonhardt@junghans-fwt.de)



# JUNGHANS Feinwerktechnik GmbH & Co. KG

Thank you for your kind attention!

