

# **ARES IM-06**

## **AUTOMATIC FIRE EXTINGUISHING SYSTEM**







# OUR FACTORIES

NERO Endüstri Savunma Sanayi A.Ş. which operates in United States of America, Bulgaria and Turkey at Ankara headquarters, is one of the largest subsystem manufacturers in Defence Industry in Turkey. Our company which is located on a plot of 12.000 m2 in Anatolia Organized Industrial Zone; has been performing hundred percent domestic design, manufacture and provide system solutions since its foundation in 2009. More than 100 engineers are assigned within its staff of 210 people. Besides, it imports 29 different countries in the world. While our group companies operate in Space Aviation field, Defence Industry, it also comprises one of the largest test centres of Turkey regarding Defence Industry



Nero Industry  
USA Factory

Nero Industry  
Bulgaria Factory

Nero Industry  
Ankara Factory

Nero Industry  
Saudi Arabia Office



Advanced Reliability



By combining design, production, monitoring, control and improvement methods conforming to ISO9001 and AS9100 standards with quality engineering and test infrastructure, it successfully competes with its global competitors and accomplishes outstanding projects together with world leaders of the sector.

Nero Industry has started project designing phase of the factory for the project which is worth 1.6 billion TL together with project-based investment incentive support on Presidential decree published in official gazette on 20th April, 2020 in order to establish Turkey's first semiconductor production factory. Turkey's first semiconductor serial production facility which will be established on 300.000 m2 plot, will bring our country to the level where we will be able to compete with semiconductor companies at global level. Nero Industry, together with its high qualified employees will create first investment phase of Turkey in this field with this project.

Within the scope of designed and qualified systems,

ARES – Fire Suppression Systems,

MARS – CBRN Detection and Filtration Systems,

ARMA – Power Systems,

UMAY – Laser Detection/Warning and Smoke Grenade Launcher Systems are included.



# 29

## NERO INDUSTRY SYSTEMS IMPORT TO 29 COUNTRIES

- Germany
- Israel
- Ukraine
- Brasil
- USA
- Azerbaijan
- Bahrain
- China
- Indonesia
- Koweit
- Malaysia
- Oman
- Pakistan
- Katar
- Singapore
- France
- Spain
- England
- Peru
- Suadi Arabia
- Turkmenistan
- United Arab Emirates
- Canada
- India
- Thailand
- Kazakstan
- Latvia
- Esthonia
- Lithuania





# IM-06 AUTOMATIC FIRE EXTINGUISHING SYSTEM

The greatest fire threats for a wheeled loader are engine, hydraulic, fuel and electric system. The fires are generally intense, hard to extinguish with a hand-held extinguisher and a fire spreading quickly on a wheeled loader not only harms the operator and the machine, but may also result in great and costly damages at construction site.

The fire extinguishing system developed by Nero Industry minimises this risk by automatically extinguishing that may break out on construction equipment.

Nero Industry provides the most reliable and the most effective fire extinguishing systems for construction equipment designed to resist harsh conditions and hard operating environment.

Systems are designed to reduce the losses resulting from fire, ensure business continuity and increase productivity of the end-users.

## Application Fields

Domestic and national **IM-06 Automatic Fire Extinguishing System** designed by Nero Industry, is designed for 7/24 protection of the vehicles and equipment at harsh environmental conditions.

The sectors where this system can be used are:

- Mining
- Forestry
- Agriculture
- Construction
- Public transportation
- Public services
- Storage areas
- Refuse collection areas

# System General Specifications

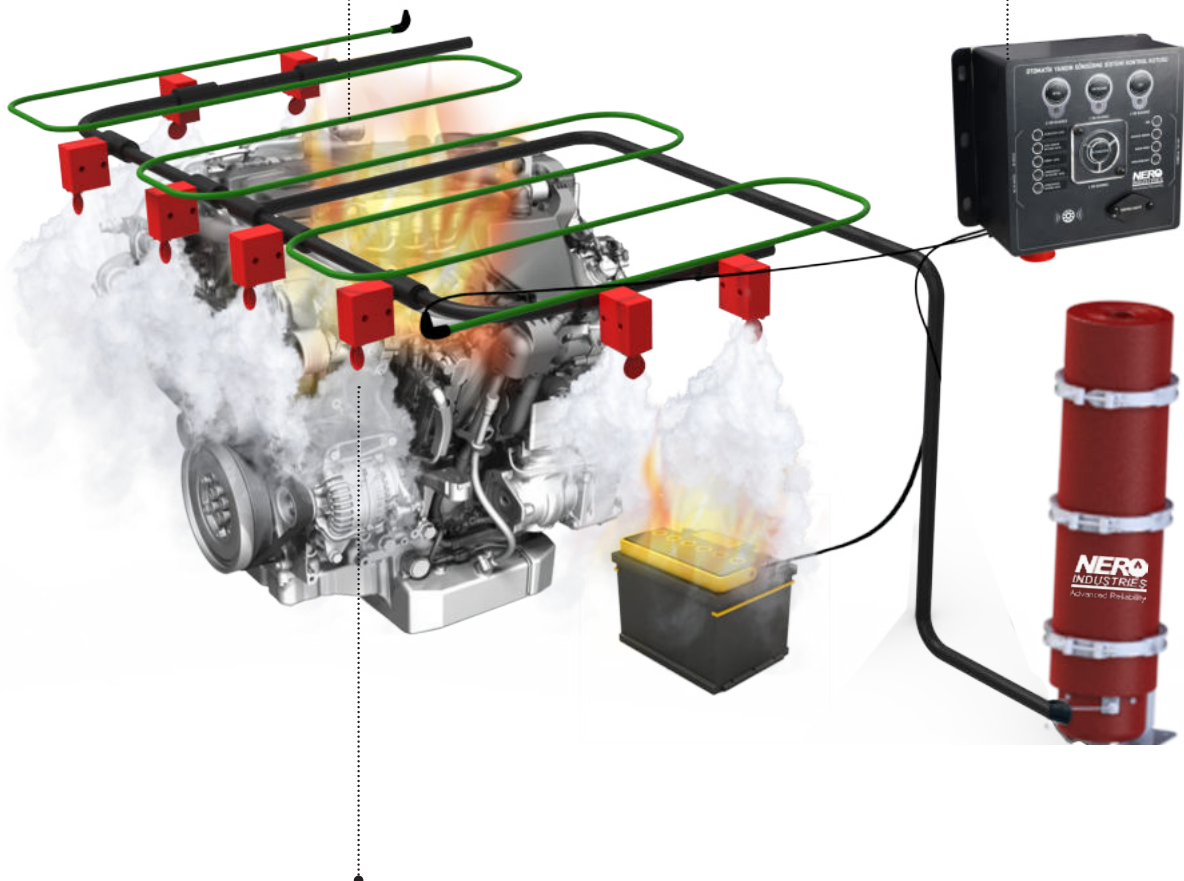
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- » Conformity to AS 5062, UNECE R107, R10 and STANAG-4317 standards
  - » Capability to record last 500 alarms and errors
  - » Led lighting indicators
  - » Automatic and manual activation system
  - » Sound warning system
  - » Activation suspense
  - » It conforms to IP 67 standards. It has water and dust ingress protection.
  - » Ability to extinguish fire within **3 secs** from breaking out time
  - » Conformance to MIL-STD-461, MIL-STD-810, MIL-STD-1275 military standards
  - » Easy installation, connection and adjustable
  - » Opportunity to programme computer on mini-USB port
  - » Built-in test feature (BIT)
  - » Design suitable for harsh environmental conditions
  - » Extinguisher and sensor error debugging
  - » Capability to make detection with optical detector sensors
  - » Optional control unit options

## IM-06 PYREX- THERMAL WIRE AUTOMATIC FIRE EXTINGUISHING SYSTEM OPERATION SCHEMATIC



» **1-** The fire is detected by **Linear sensor wire** and the signal is sent to control unit.

» **2- Control unit** analyses the incoming signal in 10 milliseconds and activates the extinguisher tube. Simultaneously, it activates the alarm horn in the vehicle and warns the user by light-voice warning system on the panel. The user can cancel extinguishing operation by cancel button if requested.



» **3- The extinguisher tube** is activated with the help of the pyrotechnic trigger it has and extinguishing agents are released. Fire extinguisher tube delivers 2X FSS liquid extinguishing agent to nozzles within 2 seconds by the help of hydraulic lines.

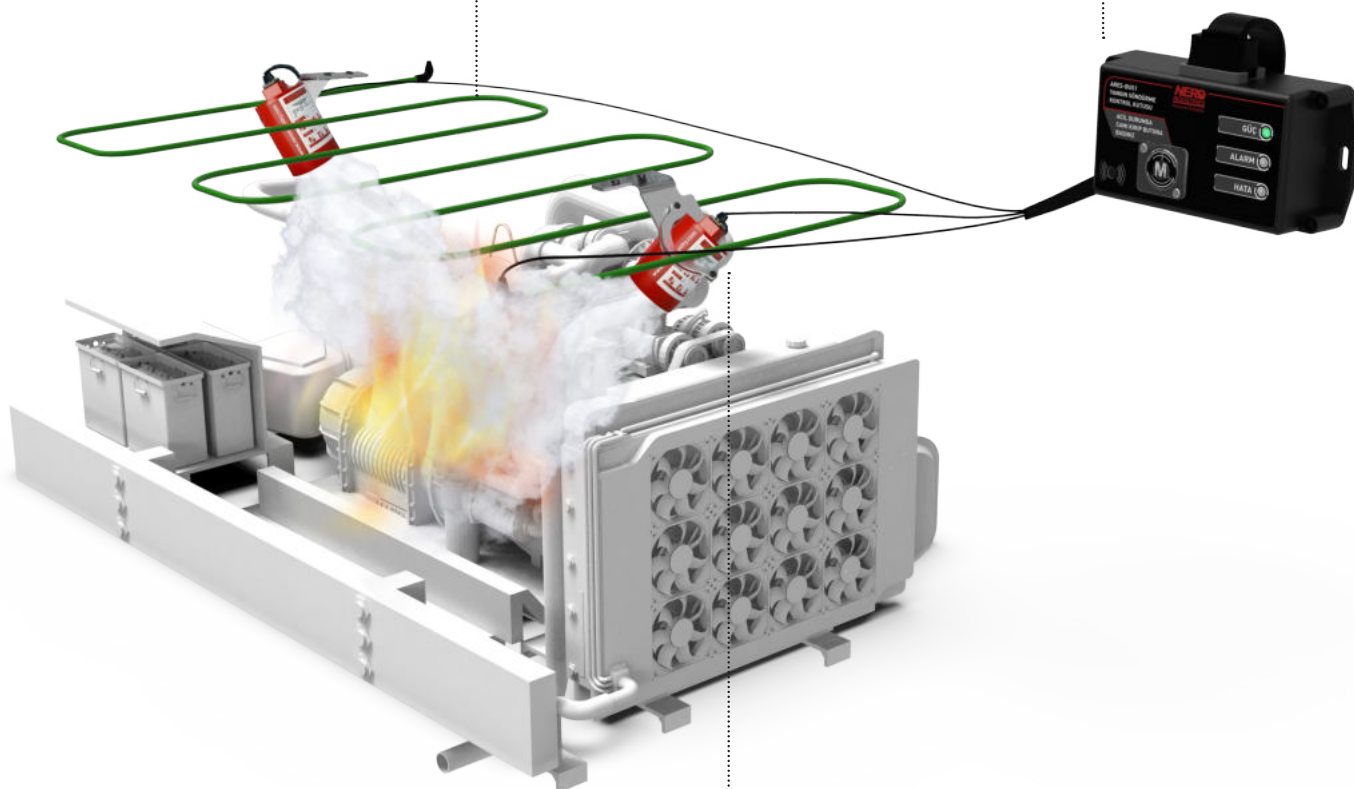


## IM-06 AEROSOL- THERMAL WIRE AUTOMATIC FIRE EXTINGUISHING SYSTEM OPERATION SCHEMATIC



1- The fire is detected by **Linear sensor wire** and the signal is sent to control unit.

2- **Control unit** analyses the incoming signal in 10 milliseconds and activates the extinguisher tube. Simultaneously, it activates the alarm horn in the vehicle and warns the user by light-voice warning system on the panel.



3- The **extinguisher tube** is activated with the help of the pyrotechnic trigger it has and extinguishing agents are released. The solid NRE-CM agent within the cylinder spreads homogenously and extinguishes

# IM-06 AEROSOL-UV-IR DETECTOR AUTOMATIC FIRE EXTINGUISHING SYSTEM OPERATION SCHEMATIC



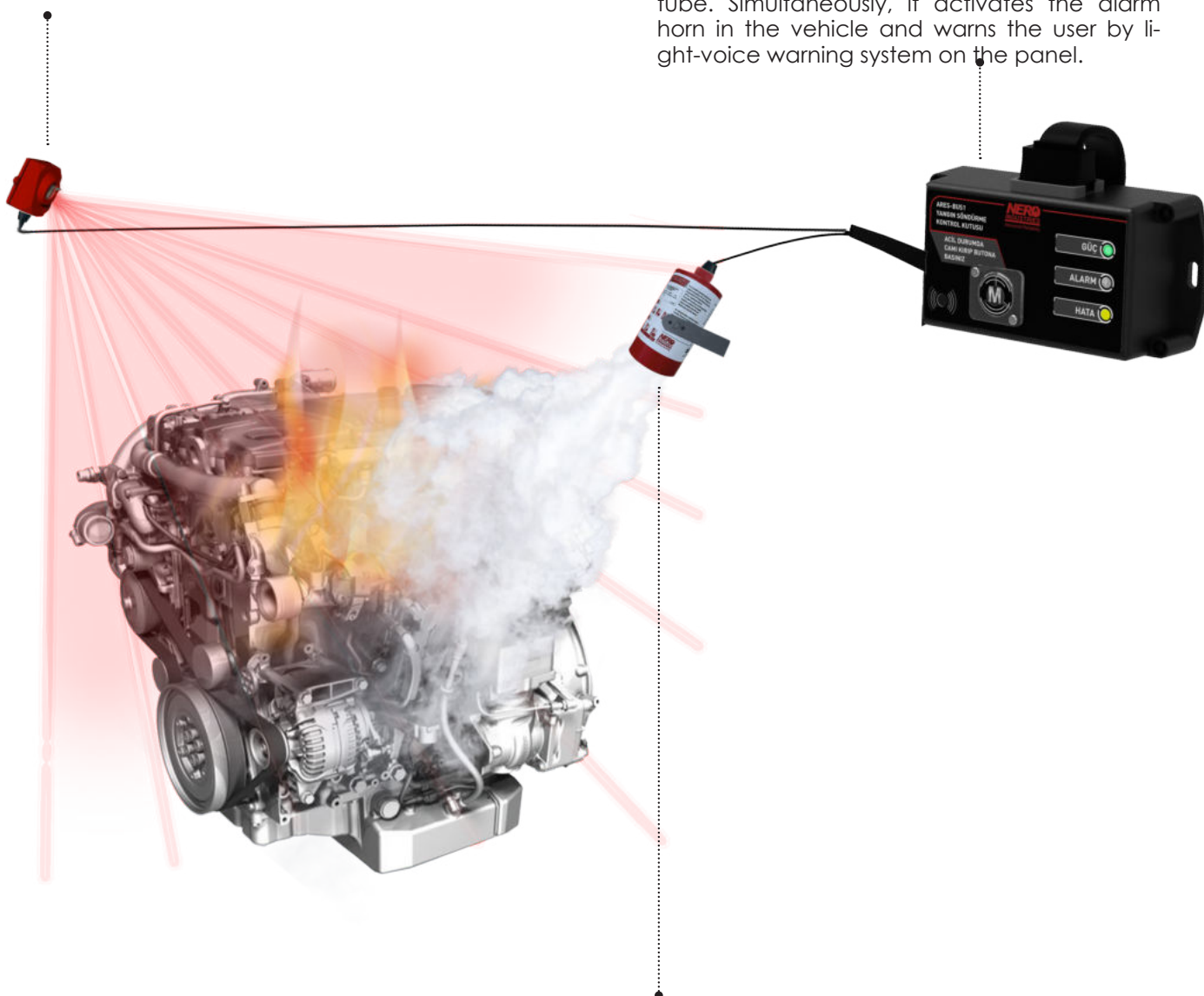
## DETECTION IN 3 MILLISECONDS

1- The fire is detected within 3 milliseconds by **UV-IR Detectors** produced by Nero Industry and the signal is sent to control unit.



## EXTINGUISHING IN 5 SECONDS

2- **Control unit** analyses the incoming signal in 10 milliseconds and activates the extinguisher tube. Simultaneously, it activates the alarm horn in the vehicle and warns the user by light-voice warning system on the panel.



3- The **extinguisher tube** is activated with the help of the pyrotechnic trigger it has and extinguishing agents are released. The solid NRE-CM agent within the cylinder spreads homogenously and extinguishes the fire within five seconds.

# IM-06 AEROSOL AUTOMATIC FIRE EXTINGUISHING SYSTEM WITH MECHANICAL ACTIVATION OPERATION SCHEMATIC



**DETECTION  
AT OPTIONAL  
TEMPERATURES**  
(57°, 68°, 79°, 93°C,  
141°C, 180°C)



**EXTINGUISHING  
IN 5 SECONDS**

- NAFEG-TD, provides independent system solution in which fire detection and extinguishing are mechanically united without any need of electricity.
- It can be activated mechanically, not being controlled by control unit and without being connected to any electrical power supply.

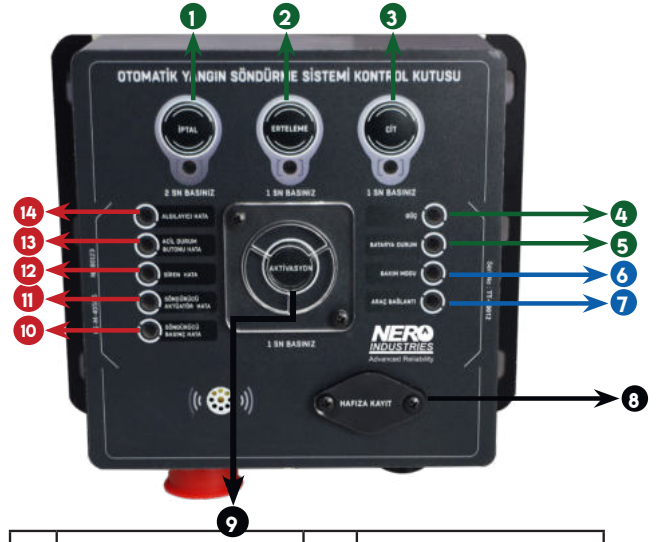


# IM-06A Control Unit



- IM-06A control unit which is designed and developed by Nero Industry completely as a completely domestic product, controls fire extinguishing and fire suppression system and it is the unit section where warning, detection and fault status of the system are monitored by power leds belonging to each tube and detector. This smart control unit which has a many-chambered compact structure, receives the detection signals for power group, body, tire, engine, crew and other compartments to be protected and activates the system.
- It has features of testing the system, manual activation and automatic activation. It has water and dust protection at IP 67 level. Error, alarm and other data regarding fire suppression and fire extinguishing system are transmitted to vehicle main computer by CANBUS communication infrastructure. IM-06A Control unit has successfully passed military test standards such as MIL-STD-810 G, MIL-STD-461F, MIL-STD-1275E standards and it has 800 hours salt fog test resistance against corrosion.

## BUTTON SPECIFICATIONS



1	ACTIVATION CANCEL BUTTON	9	SYSTEM ACTIVATION BUTTON
2	ACTIVATION SUSPENSE BUTTON	10	EXTINGUISHER PRES-SURE ERROR LED
3	BUILT-IN TEST (BIT) BUTTON	11	EXTINGUISHER ACTUA-TOR ERROR LED
4	CONTROL UNIT POW-ER INDICATOR LED	12	SYSTEM WARNING LED
5	CONTROL UNIT BAT-TERY STATUS LED	13	EMERGENCY BUTTON CONNECTION ERROR LED
6	SYSTEM MAINTENANCE MODE LED	14	SENSOR ERROR LED
7	VEHICLE CONNEC-TION LED	15	INTERNAL BUZZER
8	DATALOGGER AND SOFTWARE SOCKET		

SPECIFICATIONS	EXPLANATION
Reaction Time	Cancellation and suspense in 10 seconds
Alarm Record-ing Feature	After alarm is detected, until en-ergy is cut from the system or BIT is completed.
CAN Bus	Available (J-1939 Protocol) Conformity
Log Record	Capability to record last 500 log errors and alarms
Supply Voltage	24 Vdc nominal (16-32 Vdc)
Power Con-sumption	450 mA @ 24 Vdc (In number of components used in the system it differs $\pm 100$ mA.)
Operating Temperature	-40°C +71°C
Storage Temperature	-50°C +85°C
Weight	1860 $\pm$ 100 gr
Dimensions (Width X Height X Width)	180 x 150 x 75 $\pm$ 5 mm
Detector Read-ing Number	1 linear thermal detector
Extinguisher Reading Number	1 tube pyrotechnic
Military Test Standards It Conforms	AS 5062, UNECE R107, R10, MIL-STD-461, MIL-STD-810, MIL-STD-1275
Manual Activation	Available
Sound Warning	Available
Information Output Line	4 pieces (200 mA @ 24 Vdc, 300mA @ GND)



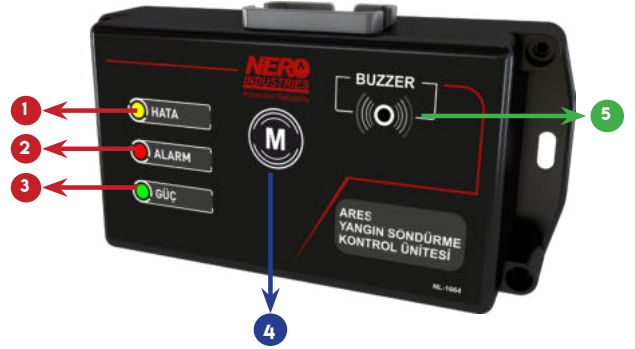
# IM-06B Control Unit



- IM-06B control unit which is designed and developed by Nero Industry as a completely domestic product, is the unit section where warning, detection and fault status of the system are monitored by power leds belonging to each tube and detector. IM-06B Control unit which operates flexibly, complying with system configurations and operating logic, controls fire extinguishing and fire suppression system.
- By means of smart control unit, system verifications and logical operations could be performed. It has features of testing the system, manual activation and automatic activation. It has water and dust protection at IP 67 level. Error, alarm and other data regarding fire suppression and fire extinguishing system are transmitted to vehicle main computer by CANBUS communication infrastructure.

SPECIFICATIONS	EXPLANATION
CAN Bus	Available (J-1939 Protocol) Conformity
Supply Voltage	24 Vdc nominal (16-32 Vdc)
Power Consumption	450 mA @ 24 Vdc (In number of components used in the system it differs $\pm 100$ mA.)
Operating Temperature	-32°C +71°C
Storage Temperature	-50°C +71°C
Weight	480 $\pm$ 50 gr
Dimensions (Width X Height X Width)	85 x 49 x 100 $\pm$ 5 mm
Impermeability	IP-65
Detector Reading Number	1 linear thermal detector or thermal wire
Extinguisher Reading Number	1 tube pyrotechnic
Military Test Standards It Conforms	AS 5062, UNECE R107, R10, MIL-STD-461, MIL-STD-810, MIL-STD-1275
Detector and tube error indicator	Available

## BUTTON SPECIFICATIONS



1	ERROR STATUS LED
2	ALARM STATUS LED
3	POWER ACTIVE LED
4	MANUAL ACTIVATION
5	ALARM STATUS INDICATOR



# LIFEC Fire Extinguisher Tube

- Lifec extinguisher tubes, protect engine of the vehicle thanks to the liquid agents it contains against any possible fire that can outbreak on construction vehicles and similar vehicles.
- This extinguishing liquid is a special liquid developed by Nero Industry; it does not give any harm to human health. The liquid agent within LIFEC is carried to requested area by the help of hoses and nozzles.
- When this system is activated, it extinguishes within 5 seconds, then it prevents any new fire from outbreaking for 3 minutes where the extinguishing liquid contacts.

SPECIFICATIONS	EXPLANATION
Reaction Time	≤ 10 milliseconds
Pressure Indicator Resistant to Vibration	Available
Triggering	Pyrotechnic Activation
MTBF	250.000 hours
Extinguisher Agent	2X FFS
Capacity	10 lt Liquid Extinguisher
Triggering Voltage	24 Vdc (10-32 Vdc). It can also be triggered at lower voltages but performance may decrease.
Water and Dust Protection	IP67
Operating temperature	-32°C +71°C
Storage temperature	-32°C +71°C
Weight	30 kg
Vertical and Horizontal Positioning	Available
Tube Nominal Pressure	45 - 100 Bar
Test Standards It Conforms	AS 5062, UNECE R107, R10, MIL-STD-461, MIL-STD-810, MIL-STD-1275



# Nafeg Aerosol Fire Extinguisher Tube

- NAFEG Aerosol Extinguisher is designed to extinguish and defuse type A (solid fuel), B (liquid fuel), C (gas fuel) fires and type E (electrical) fires in enclosed volumes.
- After the extinguishing agent concentration required for each type of fire and volume to be protected is calculated, the solid NRE- CM agent content in the NAFEG cylinder and total number of NAFEG cylinders at the area to be protected are determined. NAFEG-125, is designed to produce powdered aerosol to extinguish a fire in a 1,25 m<sup>3</sup> enclosed volume.

SPECIFICATIONS	EXPLANATION
Extinguishing Volume	1,25 m <sup>3</sup> - 2,5 m <sup>3</sup> - 5 m <sup>3</sup>
Activation Mode	Electrical
Discharge Time	4-6 seconds
Discharge Length	2 m
Optional Manual Triggering	Available
Nozzle and Hydraulic Line	Not used
Toxicity	None
Triggering voltage	24 Vdc (10-32 Vdc). It can also be triggered at lower voltages but performance may decrease.
Content	Potassium based dry chemical mixture
Operating temperature	-40°C +120°C
Storage temperature	-32°C +71°C
Weight	1,8 kg



## SPECIFICATIONS

- ⚡ No Need Electricity
- 🔊 Include Detection Feature
- 🌬 No Ozone Depletion
- 🌍 No Global Warming
- 🧴 Low Toxicity
- ⚙ Highly Efficient - 100 gr/m<sup>3</sup>
- ✅ Approved By EPA for SNAP Listing
- 🛡 Small-Safe-Simple
- 📋 For A-B-C-E Class Total Flooding Applications
- 💰 Cost Effective
- 🧊 Cool and dry; Max. 10 Years Storage/Shelf Life

## APPLICATIONS

- 🔧 CNC-Machines
- 🏢 Control Rooms (sub Floor; Above Ceiling)
- 🔌 Electrical Cabinets
- 🏭 Engine & Compressors Rooms
- 🔥 Flammable and Combustible Liquids and Gases Storage
- 🎨 Paint Lockers
- 🚢 Marine Applications
- 🖨 Server Rooms
- 📡 Telecommunications Facilities

# Aerosol Fire Extinguisher Tube with Mechanical Activation

- NAFEG-TD, provides independent system solution in which fire detection and extinguishing are mechanically united. It can be activated mechanically, not being controlled by control unit and without being connected to any electrical power supply. Thanks to the thermal sensor/activator on it, it can detect fire and get activated automatically, at various temperatures (e.g. 57°, 68°, 79°, 93°C, 141°C, 180°C) according to different requirements.



SPECIFICATIONS	EXPLANATION
Extinguishing Volume	1,25 m3 - 2,5 m3 - 5 m3
Activation Mode	Mechanical
Discharge Time	4-6 seconds
Discharge Length	2 m
Nozzle and Hydraulic Line	Not used
Toxicity	None
Triggering voltage	24 Vdc (10-32 Vdc). It can also be triggered at lower voltages but performance may decrease.
Content	Potassium based dry chemical mixture
Operating temperature	Detection at different optional temperatures (57°, 68°, 79°, 93°C, 141°C, 180°C)
Weight	1,8 kg
Test Standards It Conforms	AS 5062, UNECE R107, R10, MIL-STD-461, MIL-STD-810, MIL-STD-1275

## SPECIFICATIONS

- No Need Electricity
- Include Detection Feature
- No Ozone Depletion
- No Global Warming
- Low Toxicity
- Highly Efficient - 100 gr/m<sup>3</sup>
- Approved By EPA for SNAP Listing
- Small-Safe-Simple
- For A-B-C-E Class Total Flooding Applications
- Cost Effective
- Cool and dry; Max. 10 Years Storage/Shelf Life

## APPLICATIONS

- CNC-Machines
- Control Rooms (sub Floor; Above Ceiling)
- Electrical Cabinets
- Engine & Compressors Rooms
- Flammable and Combustible Liquids and Gases Storage
- Paint Lockers
- Marine Applications
- Server Rooms
- Telecommunications Facilities













# Fire Detection System Components

## UV-IR OPTICAL DETECTOR

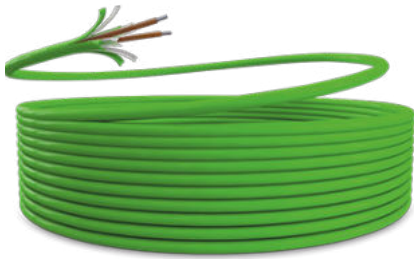


- Optical detectors detect heat and light waves at different frequencies by UV and IR sensors within it, makes required matches and send flame signal to control box. Detectors are genuinely designed by Nero Industry engineers applying to NATO Stanag 4317 and American MIL PRF 62546C standards. UV-IR flame detectors have also successfully passed high temperature, low temperature, humidity, shock-vibration, corrosion and EMI/EMC tests as per MIL-STD-810H and MIL-STD-461F standards.
- Detectors have been specially designed as IP67 and can stay under 1 meters of water for half an hour. The detectors also having protection for false alarms, do not react against false alarms such as sunlight, vehicle headlights, welding beam, infrared heater, cigarette ash.

### TECHNICAL SPECIFICATIONS

 Detection in a time period less than 3 ms	 Ultraviolet (UV) and Infrared (IR) Sensor
 Power supply: 24 VDC nominal	 Operating temperature: -51°C / +120°C
 Storage temperature: -55°C / +150°C	 Power consumption: 70 mA @ 24VDC
 Weight: 480g ±50g	 Dimensions: 85x49x100 mm (±5mm)
 140° Blind Detection	 Compatible to CAN-BUS J-1939
 IP 67 Water and Dust Protection	 Advanced Software Algorithm

## LINEAR SENSOR WIRE



- Linear sensor thermal wires are used for detecting the fire in the areas they are located in cases of fire. In this system, it is aimed to detect fire by fastening the thermal wire on surfaces in the area desired to be protected from fire. As for detection period, detection can be performed within 10 up to 40 seconds depending on magnitude, class of fire and the area it bursts out. When the ambient temperature reaches to 180 °C, the structure of the wire starts to get damaged and the outer layer melts and the wires inside touch each other and conduct fire alarm to control box.

TECHNICAL SPECIFICATIONS	
Wide detection area	Operating temperature: -32°C / +121°C
High reliability	Storage temperature: -55°C / +71°C
Operating temperature: -55°C / +150°C	MTBF Period: 200.000 hours
Cable diameter : 6 mm	Maximum Length: 15m

## EMERGENCY SWITCH



- Emergency switch, provides manual remote access to fire extinguishers in the system. It enables to activate the fire extinguishers located at crew, tire, body, engine and other compartments protected by the system.
- Manual activation switch operates independent from main controller.

TECHNICAL SPECIFICATIONS	
Indicating warning signal	Dimensions WxDxL: 77,8 x 77,8 x 75 mm (±5 mm)
Activation up to three tubes	IP67 water and dust ingress protection
MTBF duration of 150,000 hours	Salt fog test resistance of 800 hours
Operating voltage : 16-32 VDC	It has MIL-STD-810G ,MIL-STD-461G, MIL-STD-1275E certifications.
Operating temperature: -40°C +71 °C	Conforming to UL, CE GOST-R standards.

## MOTOR NOZZLE



GENERAL SPECIFICATIONS	
The engine nozzle is designed as a conical structure in order to provide effective dispersion to the engine compartment.	
It is insulated against dust, rain, mud and grease.	
Nozzles can be placed to engine compartment with the well designed brackets.	
It is produced from aluminium and resistant against corrosion.	
Weight : 160g ± 20g	





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