



ARES BUS

BUS 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 INDUSTRIES

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.



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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
- Kazakistan
- Latvia
- Esthonia
- Lithuania



ARES BUS FIRE EXTINGUISHING SYSTEM

Bus fire extinguishing systems which Nero Industry designed and certificated with the substructure it has gained in Defence Industry, in accordance with UNECE R107 regulation requirements, enable to respond fires that can burst out at engine section manually or automatically. Thanks to Nero Industry's vast product range, it can provide flexible solutions to customer needs with different agent alternatives such as FM200, Aerosol type extinguishing solution or liquid solution.

It is very important to have automatic fire detection and extinguishing systems on all light or heavy, private or commercial vehicles used for business or personal purposes, especially so as to provide life safety. Great financial losses and casualties can be prevented with an instant response.

Nero Fire Extinguishing System equipment; consist of a control unit which controls the system, detector, extinguisher tube and solution discharge nozzles that enables the response.

ECE R107 certified, Nero Bus Fire Extinguishing Systems do not harm main equipment of the vehicle, are harmless to environment and human health and makes a difference compared to its equivalents by being easily cleaned after system activation.

System General Specifications

» 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



» Optional control unit options

» Extinguisher and sensor error debugging
» Capability to make detection with optical detector sensors

» Built-in test feature (BIT)
» Design suitable for harsh environmental conditions

» Opportunity to programme computer on mini-USB port

» Easy installation, connection and adjustable assembly

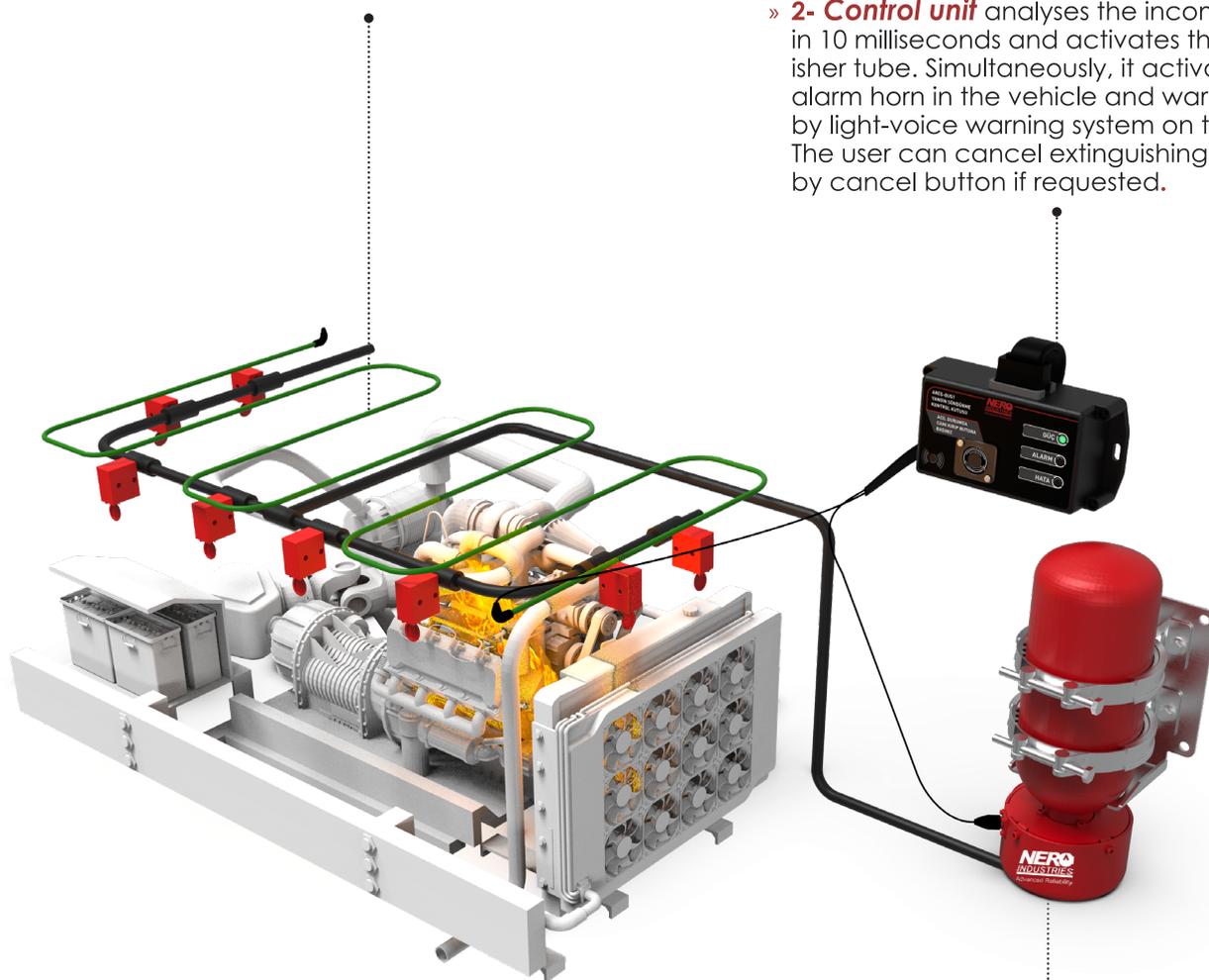
» Conformant to MIL-STD-461, MIL-STD-810, MIL-STD-1275 military standards

BUS 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.

BUS PYREX UV-IR DETECTOR WIRE AUTOMATIC FIRE EXTINGUISHING SYSTEM OPERATION SCHEMATIC



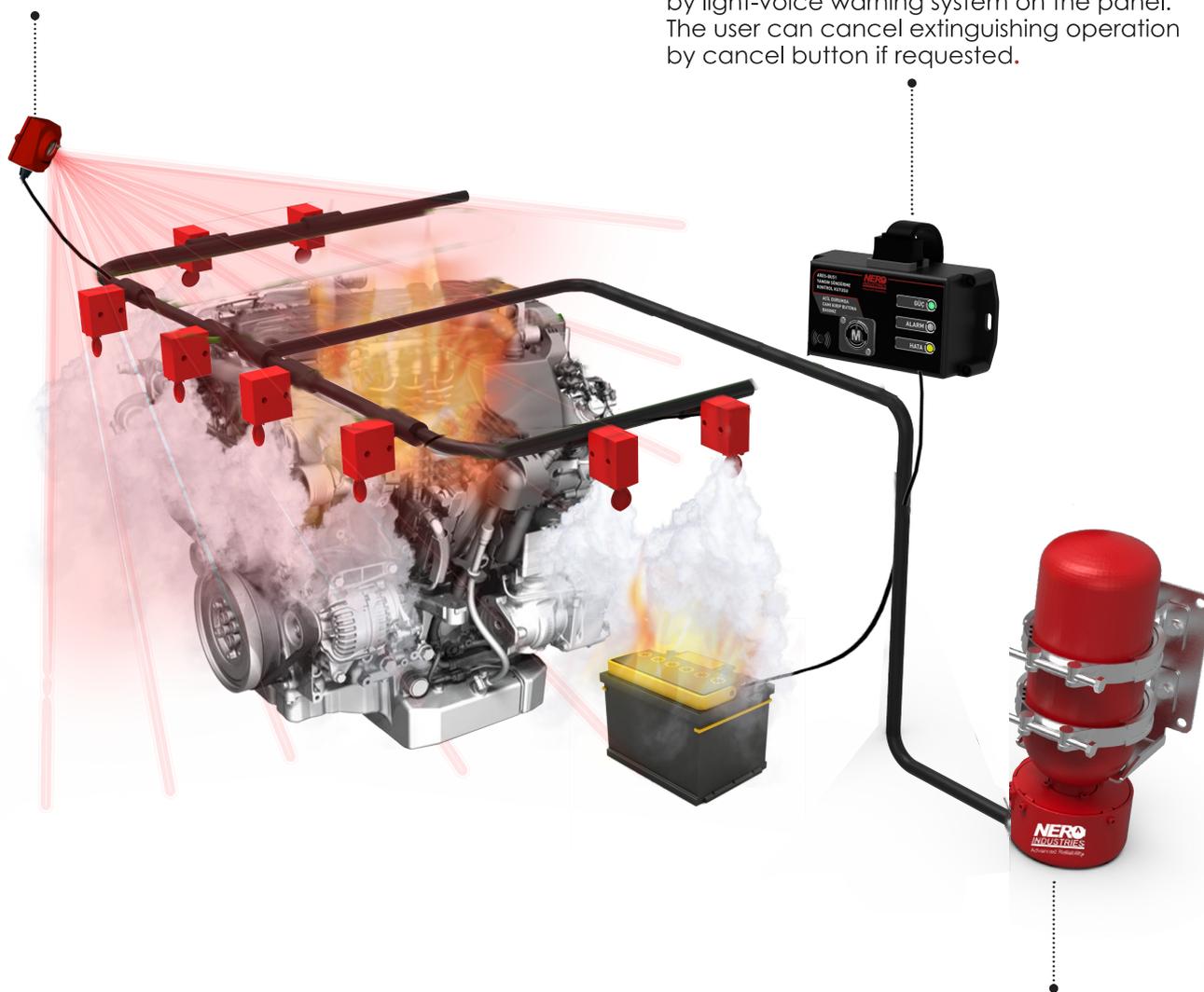
**DETECTION IN
3 MILLISECONDS**

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 2 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. The user can cancel extinguishing operation by cancel button if requested.



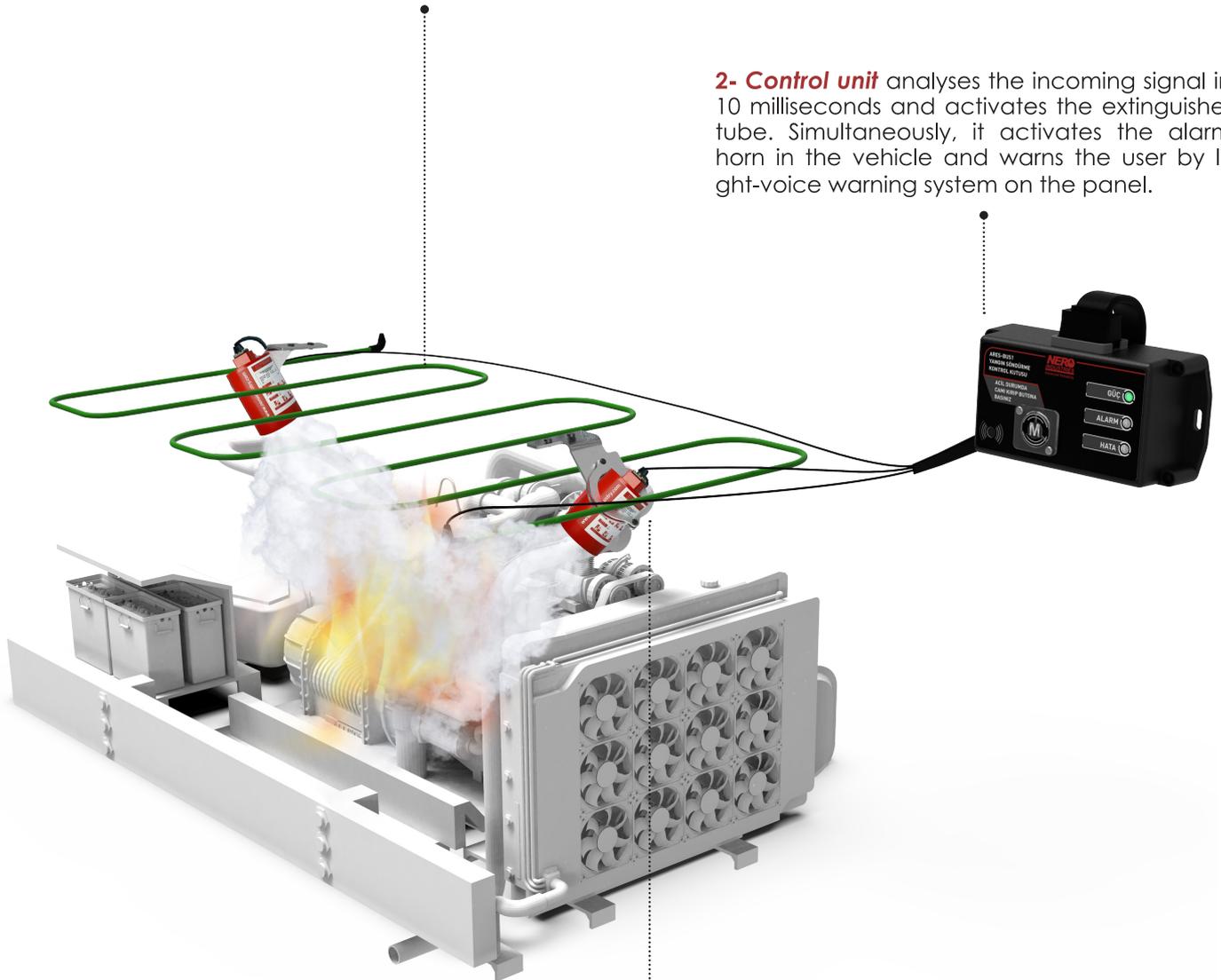
» **3- The extinguisher tube** is activated with the help of the pyrotechnic trigger it has and extinguishing agents are released. Fire extinguisher tube delivers 2X FSS liquid extinguishing agent to nozzles within 2 seconds by the help of hydraulic lines.

BUS 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.



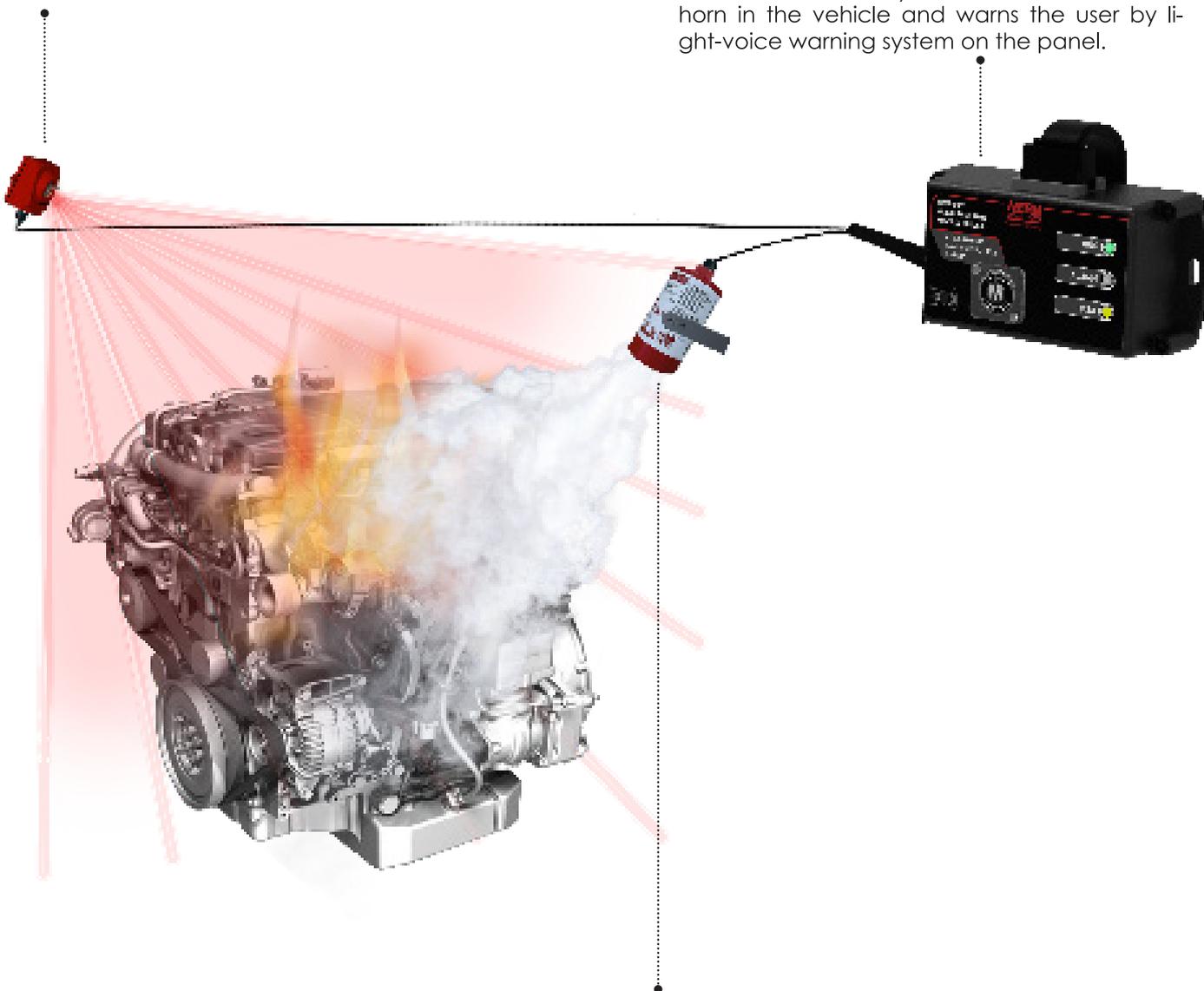
3- **The extinguisher tube** is activated with the help of the pyrotechnic trigger it has and extinguishing agents are released. The solid NRE-CM agent within the cylinder spreads homogenously and extinguishes

BUS 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.

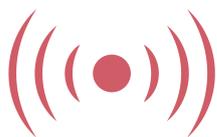


EXTINGUISHING IN 5 SECONDS

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 homogeneously and extinguishes the fire within five seconds.

ARES BUS AEROSOL AUTOMATIC FIRE EXTINGUISHING SYSTEM WITH MECHANICAL ACTIVATION OPERATION SCHEMATIC

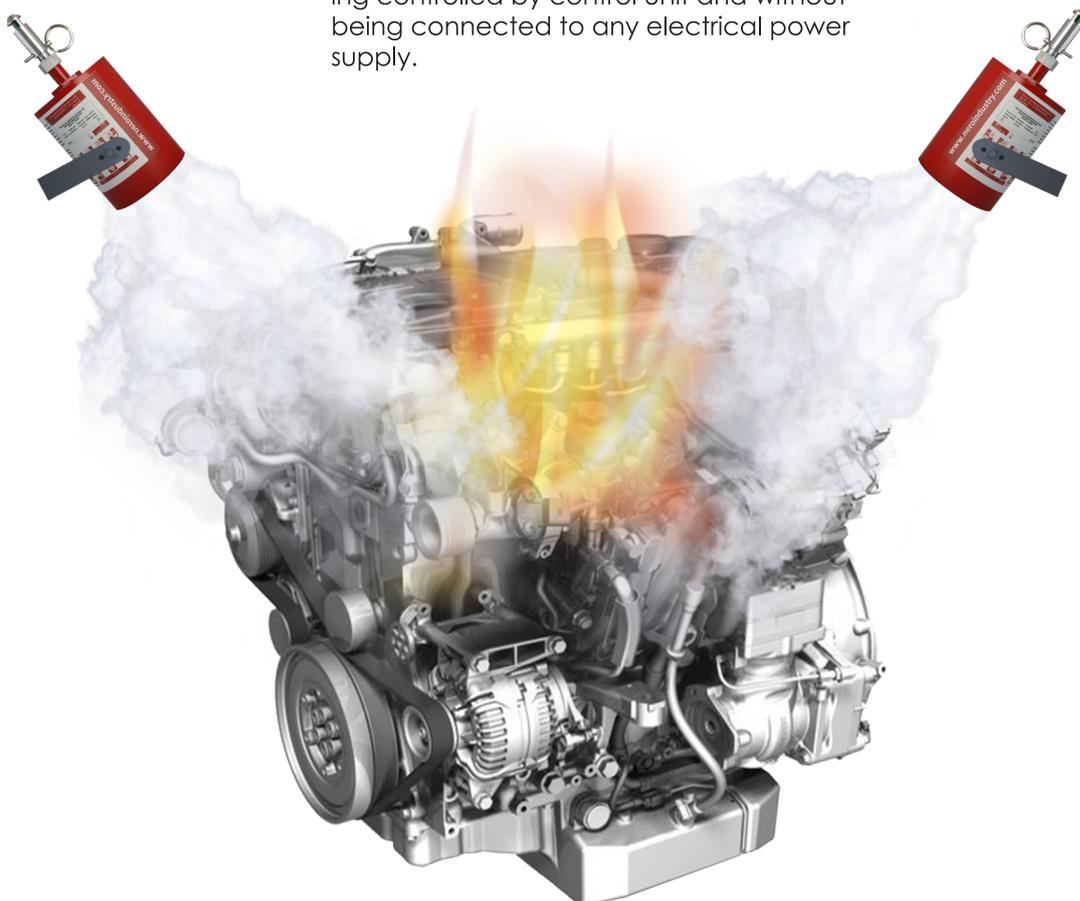


**DETECTION
AT OPTIONAL
TEMPERATURES**
(57°, 68°, 79°, 93°C,
141°C, 180°C)



**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.



Ares III+ Control Box



- Ares control unit is the unit section where warning, detection and fault status of the system which is designed and developed by Nero Industry completely as a completely domestic product, by power leds belonging to each cylinder and detector. Ares Control unit which operates flexibly, complying with system configurations and operating logic, controls fire extinguishing and fire suppression system. 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.
- By means of smart control unit, system verifications and logical operations could be performed. It has features of built-in-test, 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 ± 100 mA.)
Operating Temperature	-32°C +71°C
Storage Temperature	-50°C +71°C
Weight	2200 \pm 50 gr
Dimensions (Width X Height X Width)	180 x 86 x 149 mm (± 5 mm)
Impermeability	IP-67
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



Manual Body Activation
Manual Tires Activation
Manual Engine Activation
Manual Crew Activation
Blackout Mode
Built In Test Equipment(BIT)
Combat / Peace Mode Selection

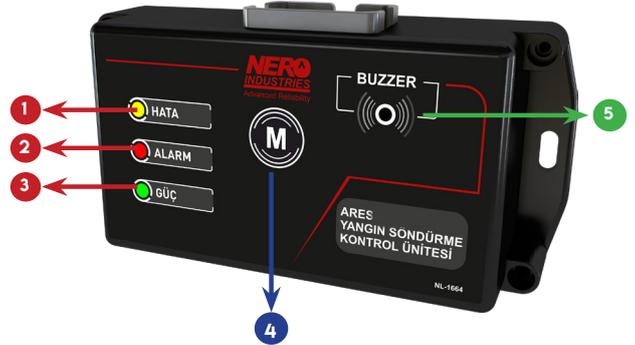
Ares Bus Control Box



- Ares Bus 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. Ares Bus 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

Pyrex Fire Extinguisher Tube

- The fire suppression cylinders eliminate the high temperature up to 2000 degrees generated within the vehicle by RPG and ATGM attacks striking the armoured vehicle and the pressure created by the explosion with the cooling agent HFC 227EA (FM-200) gas inside them. These extinguisher cylinders zero out loss of both lives and property when they are active by eliminating the high temperature generated by the rocket attack thanks to the cooling gas specification and also eliminating the high pressure with the 42 BAR pressurised operating pressure.
- Extinguisher cylinders have successfully passed high temperature, low temperature, humidity, environmental tests as per MIL-STD-810H military standards. Compared to the other extinguishers in its own segment, having an aluminium body makes it lighter and more practical. These extinguishers optionally having an operating range between -32 and +120 degrees, have completely environment friendly HFC 227EA gas. The fact that they do not leave any dust or dirt when they are active, eliminates the necessity of cleaning. The extinguishers being activated within 3 milliseconds by pyrotechnic triggers, guarantee to get activated absolutely in all kinds of environmental conditions and establishes superiority to equivalent electronic valved structures.



SPECIFICATIONS	EXPLANATION
Reaction Time	≤ 10 milliseconds
Pressure Indicator Resistant to Vibration	Available
Triggering	Pyrotechnic Activation
MTBF	250.000 hours
Extinguisher Agent	HFC 227EA (FM-200)
Capacity	3,4-4,5 lt Gaz 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	5-18 kg
Vertical and Horizontal Positioning	Available
Tube Nominal Pressure	42 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 m³ enclosed volume.



SPECIFICATIONS	EXPLANATION
Extinguishing Volume	1,25 m ³ - 2,5 m ³ - 5 m ³
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/m³
- Approved By EPA for SNAP Listing
- Small-Safe-Simple
- For A-B-C-E Class Total Flooding Applications
- Cost Effective

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 m ³ - 2,5 m ³ - 5 m ³
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/m³
- 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	

the same time, the fact that the two countries have similar political systems and similar political culture may have contributed to the similar results.

It is interesting to note that the results of the present study are similar to those of the study by Wong and Chan (2001) on the political participation of Hong Kong citizens.

There are some limitations to the present study. First, the sample size is small and the response rate is low.

Second, the data are self-reported and may be subject to social desirability bias.

Third, the data are cross-sectional and do not allow for the study of changes in political participation over time.

Fourth, the data do not allow for the study of the relationship between political participation and other variables such as political attitudes and political beliefs.

Finally, the data do not allow for the study of the relationship between political participation and other variables such as political efficacy and political trust.

Despite these limitations, the present study provides some interesting insights into the political participation of Hong Kong citizens.

It is hoped that the present study will encourage other researchers to study the political participation of citizens in other countries.

It is also hoped that the present study will encourage Hong Kong citizens to participate more actively in politics.

Finally, it is hoped that the present study will encourage the Hong Kong government to create a more participatory political system.

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