

# Owner's manual

## NANO MARINE



### FIRE DETECTION EXTINGUISHING CONTROL SYSTEM



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# 1 FOREWORD

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This owner's manual must be thoroughly read and understood before using and operating the NANO MAR SYSTEM and is intended for end users. The NANO MAR SYSTEM and the associated connections must be installed, commissioned, and maintained by a skilled, knowledgeable, and competent person or organization that is appropriately qualified to perform this work and is familiar with the objective of the equipment and the associated technical terminology.

# 2 CERTIFICATION

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The NANO MAR SYSTEM has successfully passed CE and FCC, EMC testing according to EN 50130, EN 61000, EN 55016, 47 CFR15-ICES-003, ANSI 63.4, IEC60945-pt11 and a DNV marine type approval according the DNV Class Guideline 0339-2021, certificate TAA000037H. For that the NMS has endured extensive environmental tests such as vibration, dry heat, damp heat and cold tests in accordance with the requirements of the DNV-CG 0339 standard.

# 3 INTRODUCTION

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The purpose of the NANO MAR SYSTEM is to control and monitor a number of aerosol generators mounted on a ship as part of a fire extinguishing system. The NANO MAR SYSTEM is a compact and robust stand-alone fire detection-extinguishant release system designed to protect various applications like electrical cabinets, engine rooms in vessels, yachts and other small areas or equipment. The NANO MAR SYSTEM continuously senses its inputs and, in the event of a fire, gives the correct output to enable a product specific fire extinguishing. The NANO control panel has two fire detection zones, any, or all of which can contribute to the extinguishant release decision. In a marine application, it's NOT common for a fire suppression system to be released by automatic fire detector. By default, the NANO control panel is set to only manual release, but can also be changed to automatic & manual release via push buttons on the NANO control panel.

# 4 MAINTENANCE & CLEANING

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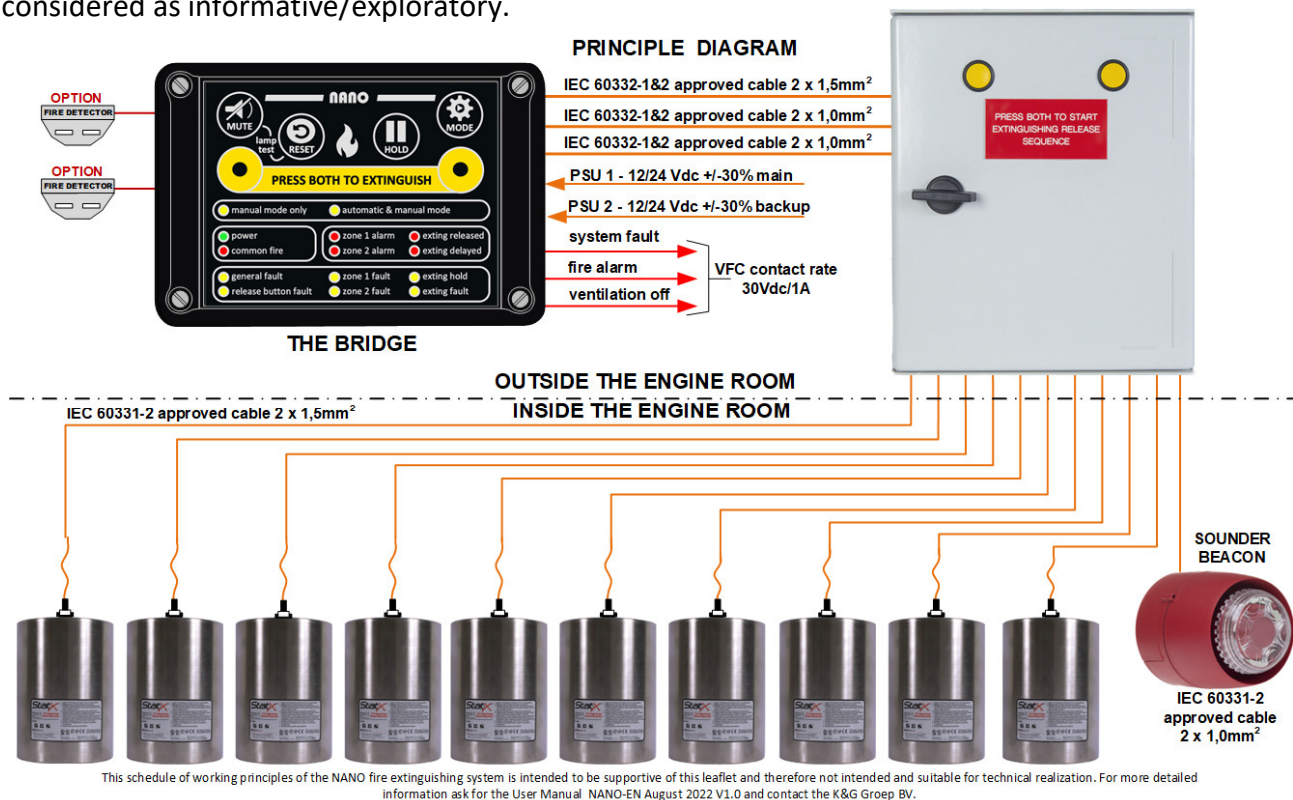
There are not user-replaceable parts in the NANO MAR SYSTEM. Take Electrostatic Discharge (ESD) precautions when opening the NANO control panel or NANO ETB BOX. Avoid direct contact with any of the components or connectors connected to the printed circuit board. Failure to follow accepted ESD handling practices could cause damage to the NANO MAR SYSTEM. Before starting the cleaning process, bring the system out of operation to prevent an unwanted fire extinguishing system release. It is important to note that improper cleaning of the NANO control panel front can damage this panel inhibit their ability to sense fire and activate the fire extinguishers. To remove dust and contaminants, **use nonalcoholic** products which has been designed for that purpose.

**Do not use high pressure or stream cleaners.**



## 5 KEY PROPERTIES

The NANO MAR SYSTEM consists of three components. The basis is formed by the NANO control panel which is placed on the bridge or in its vicinity. Then there are two extinguisher terminal boxes (ETB MAR BOX). The ETB MAR BOX must be placed outside, but in the immediate vicinity of the protected room. One is suitable for connecting up to 5 extinguishers and one for connecting up to 10 extinguishers. From the ETB MAR BOX the cable leads to the KVB plug & play Stat-X extinguisher installed in the volume to be protected. Just like on the front of the NANO control panel, on the front of the ETB MAR BOX, we have applied two dual-action buttons for releasing extinguishing. The fire extinguishers will be released, depending on the DIP switch (time) settings. In a marine application, it is NOT common for a fire suppression system intended for an engine room to be released by an automatic fire detector. But the NANO control panel has two fire zones suitable for connecting Apollo Orbis Marine approved fire detectors. The NANO MAR SYSTEM can be set up so that fire alarms from these Apollo fire detectors are detected, signaled, and reported on the NANO control panel, but considered as informative/exploratory.



## 6 FEATURES OF THE NANO MAR SYSTEM

### 6.1 ACOUSTIC ALARM

The NANO has an internal attention signal and a monitored output for external sounder/beacon.

### 6.2 EXTINGUISHANT RELEASE OUTPUT

The K&G NANO MAR SYSTEM is equipped with two activation techniques for the activation of a fire extinguishing system. By default, the NANO control panel is programmed for the activation of electrical igniters intended for aerosol fire extinguisher generators or activating an extinguishing system with a solenoid.



### 6.3 HISTORIC EVENT LOG

The NANO control panel has an historic event log memory of 10.000 events readable from a USB port. Connect an USB cable between the Mini-B USB port and your computer. The device will function as an USB stick.

### 6.4 COMMUNICATION PORT

The NANO control panel has a Modbus network connection. Modbus enables communication among devices connected to the same network.

### 6.5 DIRECT RELEASE

When the timer settings are set to a delay (between 0 – 35 seconds), the direct extinguish DIP switch gives the choose to override the delay in case of a fire event. This function can be selected with DP1.

### 6.6 GENERAL FAULT RELAY

The general fault relay signalizes, any fault in the NANO SYSTEM. The general fault relay is energized in quiescent state. In the event of a complete power failure, the general fault relay becomes inactive.

### 6.7 VFC FIRE RELAY ACTIVE IN SINGLE OF DUAL MODE ALARM

A single or dual FIRE indication can trigger the VFC relay. You can choice to have the potential free contact active at the first or at the second fire alarm. This function can be selected via dip switch 5.

### 6.8 SINGLE OR DUAL ZONE

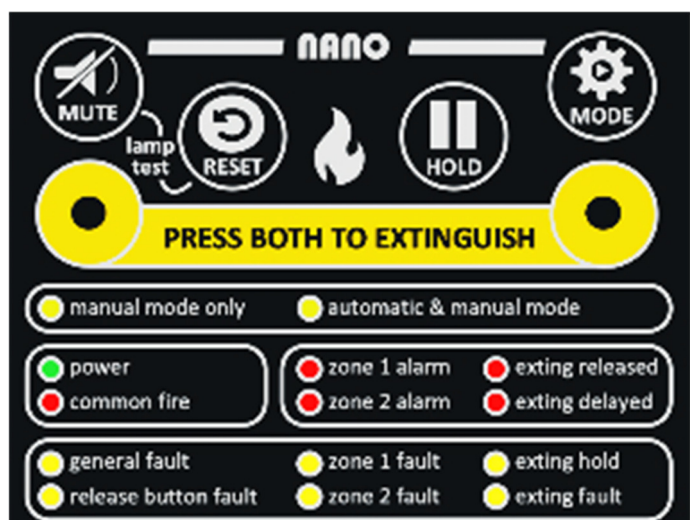
Usually, the extinguishing system is activated in the so-called two group-dependent status (avoiding coincidence). Two fire conditions must be met before an extinguishing activation will be initiated.

### 6.9 EXTINGUISHANT RELEASE DELAY

Extinguishing delay is only useful in normally occupied spaces. For the delay timer settings, there are 3 Dip Switches 6,7 and 8, which can be set in steps of 5 seconds the delay time between 0 and 35 sec.

## 7 NANO CONTROL PANEL FACIA

The NANO control panel has a clear and orderly front panel, which indicate the system status of the NANO MAR SYSTEM. The figure shows the controls and LED indicators.





## 8 CONTROL BUTTONS



### 8.1 MUTE

The buzzer can be silenced at any time by pressing the Mute button. To silence the external sounder, press the Mute button twice. In case of a second alarm the sounder and buzzer will be activated again.

### 8.2 RESET

After the cause of the alarm has been determined the NANO control panel can be reset by pressing the Reset button. Manual Call Points, if triggered, must first be reset locally.

### 8.3 LAMP TEST

All indicators and buzzer can be tested at any time by pressing the **Mute and Reset** simultaneously.

### 8.4 HOLD EXTINGUISHING RELEASE

By pressing the hold button at the panel or external hold button, as long this button is pressed, the extinguishing release sequence will be halted and cause the yellow hold activated indicator flash. Release the Hold button shall re-start the countdown release timer from programmed time (20 sec).

### 8.5 AUTOMATIC & MANUAL RELEASE OR MANUAL ONLY MODE

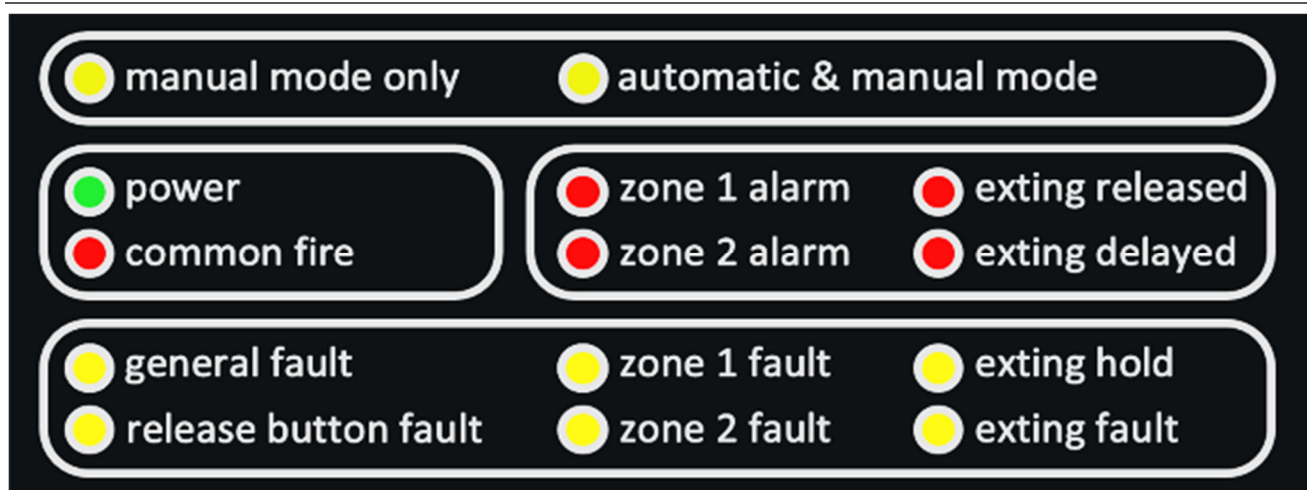
The mode of the system can be toggled between Manual Only and Automatic & Manual by operating the MODE push button on the NANO control panel. When the system is in Manual Only mode, the extinguishant cannot be released by the operation of automatic detectors. To switch the system from manual only to automatic & manual, press the MODE push button for 3 seconds. Return, press the MODE again.

### 8.6 EXTINGUISHING RELEASE

When a fire emerges, press both front extinguishing release pushbuttons, this will trigger an alarm. The fire extinguishers will be released, depending on the DIP switch (time) settings.



## 9 LED INDICATORS



The NANO control panel has 3 internal fault and 14 individual front LED indicators. Under normal condition only the green Power LED and either the Manual Only or Automatic and Manual LED lite.

### 9.1 MANUAL RELEASE ONLY

The yellow LED manual only lit, the extinguishant will only released by manual action.

### 9.2 AUTOMATIC & MANUAL RELEASE

The yellow LED automatic & manual lit, the extinguishant is released by automatic detection and/or manual release

### 9.3 POWER

Under normal conditions the NANO control panel will have only the green power on LED lit and either the manual only or automatic & manual LED lit. Failure of the mains power or disconnection of the backup power will cause a fault. The power LED lite differently, indicating an abnormality in the power supply to the NANO control panel. When starting the NANO MAR SYSTEM after a power failure or an extinguishers release, the green power LED on the NANO control panel flashes for maximal 1 minute until the system is ready and this LED lit continuously.

If the mains power supply is NOT present, the power LED flashes 1 x per second and the yellow general fault LED lit.

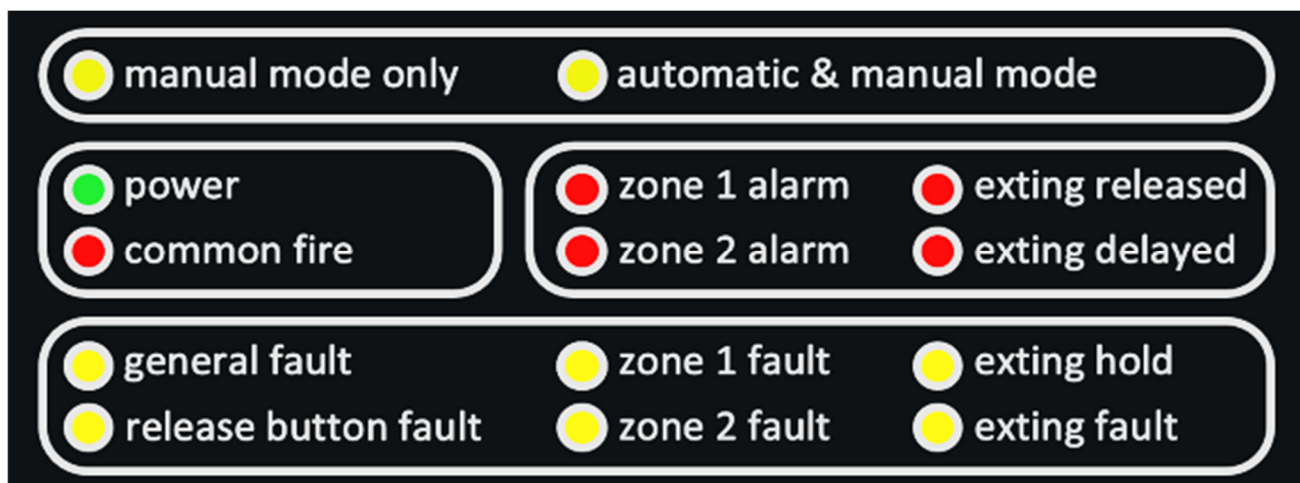
If the standby power supply is NOT present, the power LED flashes 2 x per second followed by a pause of 1 second, then repeating, the general fault and internal battery fault LED lit.

### 9.4 COMMON FIRE

In the event of a fire alarm from either the fire alarm detectors or the operation of the extinguishant release pushbuttons, the red general fire LED will lite.

### 9.5 FIRE ZONE ALARM

Upon receipt a fire alarm condition caused by the activation of a fire detector, the red alarm indicator of the relevant fire alarm zone will flash.



## 9.6 EXTINGUISHING RELEASED

The red extinguishing released indicator lights continuously when the extinguishers are activated. This extinguishing release indicator lights up after ending of the configured extinguishing delay time, or when the two extinguishing release buttons on the front or the external release button is activated.

## 9.7 EXTINGUISHING DELAYED

The red extinguishing delayed indicator indicates that the extinguishing release delay is active. This indicator flash when the delay time is running.

## 9.8 GENERAL FAULT

General fault indicator lights and specific fault indicators flash. This yellow fault indicator will light continuously at any fault condition or power malfunction.

## 9.9 FIRE ZONE FAULT

When the NANO control panel has detected an error in one of the critical fire detection paths of the system, the specific yellow zone fault indicator flash and the general fault indicator lights up.

## 9.10 EXTINGUISHING RELEASE HOLD

The yellow hold indicator flash and a different tone sounds as long the hold button on the panel front, or the external hold button is pressed.

## 9.11 EXTINGUISHING RELEASE FAULT

This yellow indicator lights up continuously when a critical fault is detected (open or short circuit) in the extinguishing output line.

## 9.12 INTERNAL FAULT INDICATORS

There are three extra yellow fault indicators on the internal electronic PCB, meant for second priority fault messages and these indicators will flash.





## 10 COMMON SETTINGS

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In a marine application, it is NOT common for a fire suppression system intended for an engine room to be released by an automatic fire detector but ONLY by manual release.

The most common Marine setting of the NANO MAR SYSTEM is based on marine rules and standards. Under normal condition only the green Power LED and the Manual Only LED lite to indicate the system is operating correctly. **Ask your supplier for your system settings.**

### **Example setting for a vessel's engine room:**

- The extinguishing delay time is 20 seconds
- The NANO MAR SYSTEM operate in the manual mode only
- The use of automatic fire detectors is only informative

### **Example setting for an electronical cabinet or auxiliary space in a vessel**

- The extinguishing delay time is set between 0 and 35 seconds
- The NANO MAR SYSTEM operate in the Automatic & Manual mode
- Dual zone alarm for automatic extinguishing release
- When release delay is programmed, the manual release is also delayed

## 11 WHAT TO DO RECOMMENDATIONS

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### **11.1 WHAT TO DO IN THE EVENT OF A FIRE ALARM CONDITION**

- Carry out the premises defined procedures.
- When it is safe to do so silence the fire alarm devices and reset the system.
- Note the time the fire alarm occurred and log the fire event in the logbook.

### **11.2 WHAT TO DO IN THE EVENT OF A FAULT CONDITION**

- Note the indications on the front of the NANO control panel.
- Note the time the fault was noticed and log the fault event in the logbook.
- Notify your service department or company of the fault condition.

### **11.3 ROUTINE TESTING RECOMMENDATIONS**

The required management and maintenance tasks and their frequency may vary by application and Country. It is the responsibility of the Premises Management to undertake periodic tests to ensure the fire detection-/extinguishing system is operational. Record the test results each time in your logbook.

**Always ensuring that the system is set to maintenance mode**

### **11.4 WARNING**

The NANO MAR SYSTEM is equipped with 2 activation techniques for activation of fire extinguishers. In the (DP3 OFF position) the system is set for the activation of electrical igniters meant for aerosol fire extinguishers. In the (DP3 ON position) the system is set for activating of an extinguishing system using a solenoid activator. DS 3 OFF = system is meant for electrical igniters intended for aerosol fire extinguishers 1,3A/50ms. With DS 3 ON the system is meant for solenoid technology.

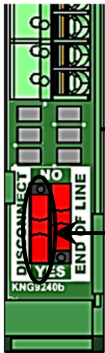
**When the DP3 is in the ON position (solenoid only) DO NOT USE this in combination with an ETB/BOX. This may cause irreparably damage to the ETB/BOX and the NANO panel.**



## 12 NANO MAR SYSTEM TEST OPTION 1

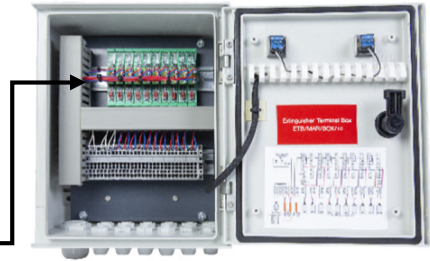
**Step 1 OPEN** the ETB MAR BOX

**Step 2 DISCONNECT** each extinguisher by using the disconnect switch on each ETB.



**Disconnect extinguisher**

**MOVE** the disconnect switch of all in the YES position and the aerosol extinguisher is disabled and can not be activated. A disablement will be signaled as fault on the NANO control panel.



**Step 3 ACTIVATE** the extinguishing by pressing simultaneous both yellow extinguishing release buttons on the ETB MAR BOX door.

**Step 4 CONFORMATION**



**Confirmation of extinguisher activation**

As confirmation of a successful extinguishment activation, the red LEDs on the extinguishers terminal board will flash and the red extinguishing released LED on the NANO control panel front lite up.

**Step 5 RESET** the system by pressing the reset button on the NANO front.



**Step 6 REPEAT** activate the extinguishing release by pressing simultaneous the extinguishing release buttons on the front of the NANO control panel .



**Step 7 CONFORMATION**

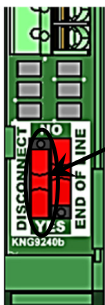


**Confirmation of extinguisher activation**

As confirmation of a successful extinguishment activation, the red LEDs on the extinguishers terminal board will flash and the red extinguishing released LED on the NANO control panel front lite up.

**Step 8 RESET** the system by pressing the reset button on the NANO control panel.

**Step 9 RESTORE** the system and re-connected the extinguishers.



**CONNECT extinguishers**

**Move** the disconnect switch in the NO position and the aerosol extinguisher is connected to the system and can be activated.

The fault LED on the front of the NANO control panel goes out. Only the green Power LED and the Manual Only LED light up to indicate that the system is ready for use.



## 13 NANO MAR SYSTEM TEST OPTION 2.

A test plug, specially developed for that purpose, is available for testing the NANO system up to the extinguishing generator.

Put this test plug in place of each extinguishing generator.

An acknowledgment of receipt of the activation pulse is indicated by the red LEDs in the test plug.

These start to pulse after receiving the activation current pulse.

**Step 1 DISCONNECT** the extinguishing generator by removing the connector. See image



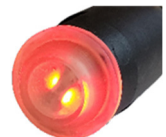
**Step 2 CONNECT** the test plug on the cable of the extinguisher. See image



**Step 3 ACTIVATE** the extinguishing by pressing simultaneous both yellow extinguishing release buttons on the ETB MAR BOX.



**Step 4 AS CONFORMATION** of a successful extinguishment activation, the red LEDs on the test plug, see image, will flash and the red extinguishing released LED on the NANO control panel front lite up.



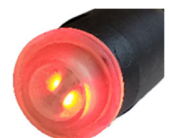
**Step 5 RESET** the system by pressing the reset button on the NANO front.



**Step 6 REPEAT** activate the extinguishing release by pressing simultaneous the extinguishing release buttons on the front of the NANO control panel.



**Step 7 AS CONFORMATION** of a successful extinguishment activation, the red LEDs on the test plug will flash. See image



**Step 8 RESET** the system by pressing the reset button on the NANO front.



**Step 9 END** the test session, restore the system, and re-connected the extinguishers.



## 14 MAINTENANCE RECOMMENDATIONS

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### 14.1 DAILY TESTING (PREMISES MANAGEMENT)

To be conducted by the Premises Management. Check that the panel shows no fire or fault indications. If there are any fault conditions indicated, then follow instructions in section 11.

### 14.2 WEEKLY TESTING (PREMISES MANAGEMENT)

To be conducted by the Premises Management.

- Perform a Lamp Test to check that all visual and audible indicators on the panel are functioning.
- When automatic fire detectors are involved bring NANO control panel in ONLY manual mode
- Test then at least one detector to confirm the operation of the control panel and the audible alarms.
- Carry out an inspection of the extinguishing system according to the instructions of the supplier.

### 14.3 QUARTERLY TESTING (COMPETENT PERSON)

To be conducted by the Competent Person. Included as reference for the Premises Management.

- Check all previous logbook entries and verify that any corrective actions had been taken.
- Carry out the weekly test.
- Check extinguishers conform the described test method 1 or 2 depending on the availability of test plugs.
- Check the emergency power supply. Disconnect mains power (PSU1) of the NANO control panel and verify that the emergency power (PSU 2) is functioning.

### 14.4 YEARLY TESTING (COMPETENT PERSON)

To be conducted by the Competent Person. Included as reference for the Premises Management.

- Carry out the quarterly test.
- Test ALL fire detection devices and the manual release and hold buttons.
- The control panel case should be cleaned periodically by wiping with a soft, damp cloth.

## 15 WARRANTY

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K&G represent the NANO/MAR SYSTEM and is free from defects in materials and workmanship. Our warranty does not cover a NANO/MAR SYSTEM which is damaged, misused, and/or used contrary to the supplied operating manuals or which has been repaired or altered by others. The liability of K&G is at all times limited to repair or, at K&G's discretion, replacement of the NANO/MAR SYSTEM. K&G shall not under any circumstances be liable for any indirect, special, or consequential damages such as, but not limited to, damage or loss of property or equipment, cost of de-installation or reinstallation, cost of transport or storage, loss of profits or revenue, cost of capital, cost of purchased or replacement goods, or any claims by customers of the original purchaser or third parties or any other similar loss or damage, whether incurred directly or indirectly. Remedies set forth herein to the original purchaser and all others shall not exceed the price of the NANO/MAR SYSTEM supplied. This warranty is exclusive and expressly in lieu of all other warranties, whether expressed or implied, including, without limitation, any warranties of merchantability or fitness for a particular purpose. It is the responsibility of the premises management to define the fire procedures and ensure that all relevant users are trained and that fire drills are performed with appropriate isolation measures in place to ensure that accidental discharge of the extinguishant agent is avoided. It is also the responsibility of the premises management to ensure that there is nothing that can impede the operation of the fire detection and extinguishant system and prevent any obstructions from blocking fire detection/activation devices.

**This owner's manual only applies to the NANO MAR detection and activation system.  
For more information about the management, inspection, and maintenance procedures  
of the extinguishing system, please contact your extinguishing system supplier.**

