

Owner's Manual



NANO

FIRE DETECTION & EXTINGUISHING CONTROL SYSTEM



FC CE

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1 FOREWORD

Before using or operating the NANO system, this Owner's Manual must be read thoroughly and understood. This manual is intended for end users. The NANO system, including all associated connections, must be installed, commissioned, and maintained only by qualified personnel or organizations with the necessary skills, knowledge, and competence. Personnel performing these tasks must be familiar with the purpose of the equipment and the relevant technical terminology. The NANO system has successfully passed CE and FCC compliance testing, including EMC testing in accordance with the following standards: EN 50130, EN 61000, EN 55016, 47 CFR15-ICES-003, ANSI 63.4. In addition, the NANO system has obtained DNV type approval in accordance with DNV-CG-0339.

2 INTRODUCTION

The NANO is a compact and robust stand-alone fire detection and extinguishant release panel designed to protect applications such as electrical cabinets, CNC machines, engine rooms in vessels and yachts, vehicles, and other small areas or equipment requiring rapid fire detection and suppression. The NANO continuously monitors its inputs and activates a product-specific extinguishing system in the event of a fire. Release can be initiated manually via the front panel buttons, an external release button, or automatically through fire sensor inputs. In marine applications, the default configuration is manual release only, as automatic release in engine rooms is not common practice. The system can be configured for automatic and manual release if required. With two detection zones, the NANO provides a versatile and high-performance fire protection solution. The NANO is a versatile fire detection and extinguishing release system designed for reliable high-performance operation.

3 WARRANTY

K&G GROEP B.V. warrants that the NANO system is free from defects in materials and workmanship under normal use. This warranty does not apply to products that have been damaged through misuse, improper installation, unauthorized modification or repair, or use contrary to the instructions in this manual. K&G GROEP B.V.'s obligation under this warranty is limited, at its sole discretion, to the repair or replacement of the defective product. K&G GROEP B.V. shall not be liable for any indirect, incidental, consequential, or special damages arising from the use of the NANO system. The warranty may be void if the equipment has been damaged by electrostatic discharge (ESD).

User Responsibilities

The premises management is responsible for establishing and maintaining appropriate fire safety procedures. All relevant personnel must be trained in these procedures, and regular fire drills shall be conducted using appropriate isolation measures to prevent accidental discharge of the extinguishing agent.

**This This Owner's Manual applies only to the NANO detection and activation system.
For information regarding the operation, inspection, maintenance, and servicing of the
extinguishing system, please contact the supplier of the extinguishing system.**



4 MAINTENANCE & CLEANING

The NANO system contains no user-serviceable or user-replaceable parts. Do not open the enclosure unless instructed to do so by qualified service personnel. If the enclosure is opened, appropriate Electrostatic Discharge (ESD) precautions must be observed. Always wear a properly grounded anti-static wrist strap. Avoid direct contact with electronic components and connectors on the printed circuit board, and do not allow the electronics to come into contact with clothing, as static charges from fabrics cannot be dissipated by the wrist strap. Failure to follow proper ESD handling procedures may result in damage to the NANO system. To clean the front panel, use only non-alcohol-based cleaning products intended for electronic equipment. Improper cleaning may damage the front panel and impair the system's ability to detect fire and activate the extinguishing system.

Do not use high-pressure or steam cleaners.

5 KEY PROPERTIES

The NANO system is designed for both land-based and marine applications. It is DNV type approved in accordance with the DNV-CG-0339 standard. The NANO solution consists of two main components: the NANO control panel and an Extinguisher Terminal Box (ETB). The control panel is typically installed on or near the bridge. The ETB must be installed outside, but in close proximity to, the protected engine room. Two ETB versions are available:

- ETB – suitable for igniters with a maximum resistance of 2 Ω .
- ETB/H – suitable for igniters with a maximum resistance of 4 Ω .

The extinguishing agent is released after the configured delay time, as determined by the DIP switch settings. In marine applications, engine room fire extinguishing systems are normally activated manually rather than automatically by fire detectors. Nevertheless, the NANO system provides two fire detection zones for connecting Marine approved fire detectors. When configured for manual release only (factory default), alarms from the connected fire detectors are detected, indicated, and reported on the NANO control panel for information and investigation purposes only. If required, the system can be reconfigured to support both automatic and manual release.

- Configurable for manual, single-stage, or double-stage detection, alarm, and extinguishing release.
- Outputs for fire alarm, fault, ventilation shutdown, and visual and audible alarm devices.
- Fully monitored output for aerosol fire extinguishing generators.
- Two fully monitored fire alarm input zones for linear heat and/or conventional fire detectors.
- Two fully monitored input zones for external extinguishing release and hold functions.
- Dual extinguisher release buttons to prevent unintended activation.
- Extinguishing hold button to postpone the release sequence.
- Extinguishing release delay to prevent unintended activation.
- Adjustable extinguishing delay from 0 to 35 seconds.
- Additional option to override the extinguishing delay after manual release.
- Additional functionality for separate external hold-off functions.
- Additional functionality for separate external extinguishing release functions.
- Historical event log memory accessible via a USB port.
- Modbus RS485 communication port.
- Operating voltage: 8 to 28 VDC.
- IP65-rated enclosure with cable glands.
- ESD and EMC protected, CE and FCC marked.
- DNV-CG Type Approval in accordance with the DNV-CG 0339 standard.



6 FEATURES NANO

6.1 ACOUSTIC ALARM

The NANO is equipped with an internal audible alarm and a supervised output for connecting an external sounder and/or beacon.

6.2 EXTINGUISHANT RELEASE OUTPUT

The NANO supports two activation methods for releasing a fire extinguishing system. By default, the system is configured to activate electrical igniters for aerosol fire extinguishing generators or to operate a solenoid valve for other extinguishing systems.

6.3 HISTORIC EVENT LOG

The NANO stores up to 10,000 events in its internal event log. The event log can be accessed via the USB port by connecting the NANO to a computer. The device will appear as a USB storage device, allowing the log files to be viewed or copied.

6.4 COMMUNICATION PORT

The NANO is equipped with a Modbus communication interface for integration with external monitoring and control systems.

6.5 DIRECT RELEASE

When an extinguishant release delay of 10 to 35 seconds is configured, the Direct Release function can override the programmed delay and immediately activate the extinguishing system during a fire event. This function is enabled using DIP switch 1 (DP1).

6.6 VEHICLE MODE

Vehicle Mode is intended for engine compartment protection in vehicles. When the vehicle is parked and the driver has left the vehicle, the programmed extinguishant release delay is automatically disabled to allow immediate activation. driver leaves the vehicle.

Note: Vehicle Mode is not available when the system is configured for Manual Release Only.

6.7 GENERAL FAULT RELAY

The General Fault Relay indicates any fault condition detected by the NANO. The relay is energized during normal operation and de-energizes in the event of a fault or complete power failure.

6.8 VFC FIRE RELAY ACTIVE IN SINGLE OR DUAL MODE ALARM

The voltage-free contact fire relay can be configured to activate after either the first fire alarm or the second fire alarm (dual-zone alarm). This setting is selected using DIP switch 5.

6.9 SINGLE OR DUAL ZONE

The NANO can operate in either Single-Zone or Dual-Zone mode. In Dual-Zone mode, extinguishant release is initiated only after both detection zones have entered a fire alarm condition. This two-zone dependency helps reduce the risk of unwanted system activation.

6.10 EXTINGUISHANT RELEASE DELAY

The extinguishant release delay is intended for normally occupied areas, allowing personnel sufficient time to evacuate before the extinguishing system is activated. The delay time is configured using DIP switches 6, 7, and 8 and can be set from 0 to 35 seconds in 5-second increments.



7 NANO CONTROL PANEL FACIA

The NANO features a clear and intuitive front panel that provides a visual indication of the system status. The figure below identifies the controls and LED indicators.



8 CONTROL BUTTONS



8.1 MUTE

Press the Mute button to silence the internal buzzer. To silence the external sounder, press the Mute button twice. If a new alarm occurs, the internal buzzer and external sounder will be reactivated.

8.2 RESET

After the cause of the alarm has been identified and resolved, press the Reset button to reset the system. If a Manual Call Point has been activated, it must first be reset locally before the NANO can be reset.

8.3 LAMP TEST

Press the **Mute** and **Reset** buttons simultaneously to test all LED indicators and the internal buzzer.



8.4 HOLD EXTINGUISHING RELEASE

Press and hold the Hold button on the NANO or an external Hold button to temporarily suspend the extinguishant release sequence. While the button is pressed, the Hold Active indicator flashes. When the Hold button is released, the release delay timer restarts from the programmed delay time.

8.5 AUTOMATIC & MANUAL RELEASE OR MANUAL ONLY MODE

The operating mode can be switched between **Manual Only** and **Automatic & Manual** using the **Mode** button. In **Manual Only** mode, automatic fire detectors generate fire alarms but cannot activate the extinguishing system. To switch to **Automatic & Manual** mode, press and hold the **Mode** button for approximately 3 seconds. Press the **Mode** button again to return to **Manual Only** mode.

8.6 EXTINGUISHING RELEASE

In the event of a fire, press both Extinguishant Release push buttons simultaneously to manually initiate the extinguishing sequence. The extinguishing system will be activated immediately or after the programmed release delay, depending on the configured DIP switch settings.

8.7 TEST MODE

The NANO includes a Test Mode that allows the fire detection, alarm, and fault functions to be tested without activating the extinguishant release output. To enable Test Mode, press and hold the Mode and Hold buttons simultaneously for approximately 1 second.

When Test Mode is enabled:

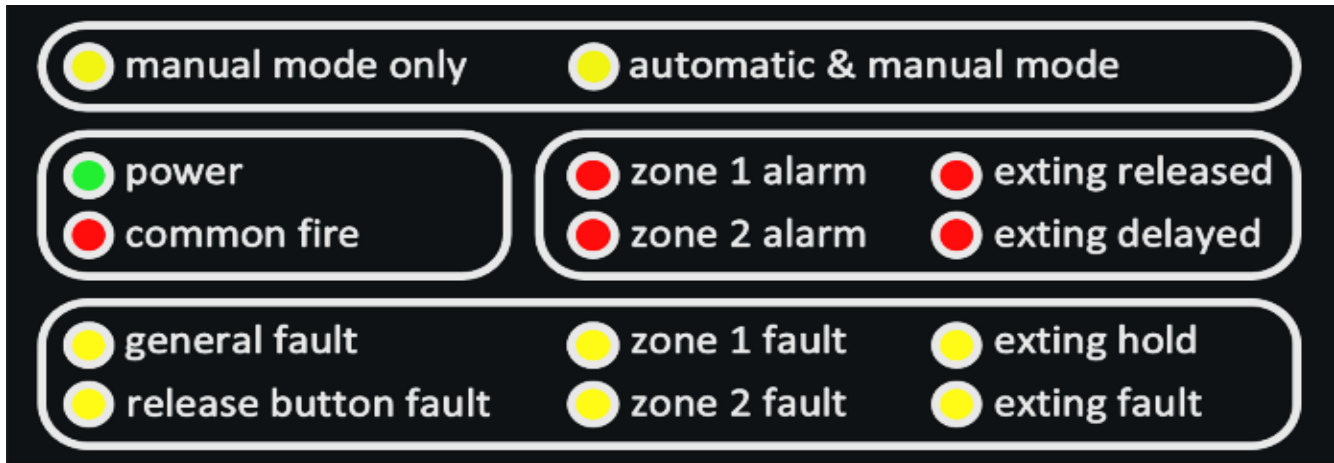
- The General Fault Relay is activated.
- The yellow Extinguish Fault indicator remains continuously illuminated to indicate that the system is in Test Mode.
- If an open circuit or short circuit is detected in the extinguishant release circuit, the Extinguish Fault indicator flashes.

To exit Test Mode and return the system to normal operation, press the Mode and Hold buttons simultaneously for approximately 1 second. The Extinguish Fault indicator will turn off.



9 LED INDICATORS

The NANO features **3 internal fault indicators** and **14 front-panel LED indicators** that provide a clear overview of the system status. During normal operation, only the green **Power** LED and either the **Manual Only** LED or the **Automatic & Manual** LED are illuminated.



9.1 MANUAL RELEASE ONLY

When the yellow Manual Only LED is illuminated, the extinguishing system can only be activated by manual operation.

9.2 AUTOMATIC & MANUAL RELEASE

When the yellow Automatic & Manual LED is illuminated, the extinguishing system can be activated either automatically by fire detection or manually by the operator.

9.3 COMMON FIRE

In the event of a fire alarm, either from the connected fire detectors or from operation of the extinguishant release push buttons, the red Common Fire LED will illuminate.

9.4 FIRE ZONE ALARM

When a fire alarm condition is detected by a fire detector, the red alarm LED of the corresponding fire zone will flash.

9.5 POWER

Under normal operating conditions, the NANO control panel shows the following indications:

- The green Power LED is continuously illuminated.
- Either the yellow Manual Only LED or the yellow Automatic & Manual LED is illuminated, depending on the configured operating mode.

A failure of the mains power supply or the backup power supply will generate a fault indication. The green Power LED will flash to indicate an abnormal power supply condition.

After restoring power, or after an extinguishant release, the NANO performs a system check. During this period, the green Power LED flashes for a maximum of 1 minute. When the system is ready for operation, the Power LED remains continuously illuminated.

Mains Power Failure

If the mains power supply is unavailable:

- The green **Power** LED flashes once per second.
- The yellow **General Fault** LED is illuminated.



Backup Power Failure

If the backup power supply is unavailable:

- The green **Power** LED flashes twice per second, followed by a 1-second pause. This sequence repeats continuously.
- The yellow **General Fault** LED and the yellow **Internal Battery Fault** LED are illuminated.

Vehicle Mode

When **Vehicle Mode (DP2)** is enabled, the green **Power** LED flashes at approximately 90 flashes per minute when the system switches to the backup power supply.

9.6 EXTINGUISHING RELEASED

The red Extinguishant Released indicator illuminates continuously when the extinguishing system has been activated. The indicator illuminates after the programmed extinguishant release delay has expired, or immediately after activation of the two front-panel extinguishant release buttons or an external release button.

9.7 EXTINGUISHING RELEASE CONFIRMED

The NANO system is equipped with a Discharge Confirmed indication. When the extinguishing system is activated, the red Extinguishant Released LED starts flashing. The LED remains continuously illuminated once successful activation of the electrical igniters has been confirmed.

9.8 EXTINGUISHING DELAYED

The red Extinguishant Delayed indicator indicates that the extinguishant release delay is active. The indicator flashes while the programmed delay time is running.

9.9 GENERAL FAULT

The yellow General Fault indicator illuminates when a fault condition or power supply problem is detected. The related fault indicators provide additional information about the specific fault condition.

9.10 FIRE ZONE FAULT

If the NANO detects a fault in one of the critical fire detection circuits, the corresponding yellow Fire Zone Fault indicator flashes and the yellow General Fault indicator illuminates.

9.11 EXTINGUISHING RELEASE HOLD

The yellow Hold indicator flashes and a different audible tone is activated while the Hold button on the front panel or an external Hold button is pressed. While the Hold function is active, the extinguishant release sequence is temporarily suspended.

9.12 EXTINGUISHING RELEASE FAULT

The yellow Test indicator illuminates continuously when the system is in Test Mode. If a critical fault is detected in the extinguishant release output circuit, the yellow Extinguishant Release Fault indicator flashes. The indicator turns off automatically once the fault has been cleared.

9.13 INTERNAL FAULT INDICATORS

The NANO contains three additional yellow fault indicators located on the internal electronic PCB. These indicators are intended for secondary fault information and are primarily used for service and maintenance purposes. The indicators flash when a related internal fault is detected.



10 COMMON SETTINGS

In marine applications, fire suppression systems protecting engine rooms are normally activated by manual release only. Automatic release by fire detectors is generally not used for engine room protection. The most common marine configuration of the NANO system is based on applicable marine rules and standards. Under normal operating conditions, only the green Power LED and the yellow Manual Only LED are illuminated, indicating that the system is operating correctly. The actual system configuration depends on the installation. Please contact your system supplier for the specific settings of your NANO system.

Example Configuration: Vessel Engine Room:

- Extinguishant release delay: 20 seconds
- Operating mode: Manual Release Only
- Automatic fire detectors: Information and alarm indication only

Example Configuration: Electrical Cabinet or Auxiliary Space:

- Typical settings for an electrical cabinet or auxiliary space application:
- Extinguishant release delay: 0 to 35 seconds
- Operating mode: Automatic & Manual Release
- Automatic extinguishant release requires a dual-zone fire alarm
- When a release delay is configured, manual release activation is also subject to this delay



11 RECOMMENDED ACTIONS

11.1 ACTIONS IN THE EVENT OF A FIRE ALARM CONDITION

In the event of a fire alarm:

- Follow the fire safety procedures established for the premises.
- When it is safe to do so, silence the alarm devices and reset the system.
- Record the time of the fire alarm and document the event in the system logbook.

11.2 ACTIONS IN THE EVENT OF A FAULT CONDITION

In the event of a system fault:

- Check and record the indications shown on the front panel.
- Record the time the fault was detected and document the event in the system logbook.
- Contact your service department or authorized service provider to report the fault.

11.3 ROUTINE TESTING RECOMMENDATIONS

The required inspection, testing, and maintenance activities, including their frequency, may vary depending on the application and local regulations. The premises management is responsible for ensuring that the fire detection and extinguishing system is tested periodically to verify correct operation. All test results must be recorded in the system logbook. Before carrying out any testing or maintenance activities, **always ensure** that the system is placed in **Maintenance Mode**.

11.4 WARNING – EXTINGUISHANT ACTIVATION CONFIGURATION

The NANO supports two different activation methods for fire extinguishing systems.

DP3 OFF position: The NANO is configured for activation of electrical igniters used in aerosol fire extinguishing generators.

- Output: 1.3 A / 50 ms

DP3 ON position: The NANO is configured for activation of extinguishing systems using a solenoid actuator.

- Output: 24 V DC / 1 A

Important:

When DP3 is set to the ON position (Solenoid Activation Only), do not use the NANO in combination with an Extinguishing Terminal Box (ETB). Incorrect configuration may cause permanent damage to the ETB and/or the NANO control panel.



12 MAINTENANCE RECOMMENDATIONS

12.1 TEST THE NANO SYSTEM WITHOUT ACTIVATING THE EXTINGUISHERS.

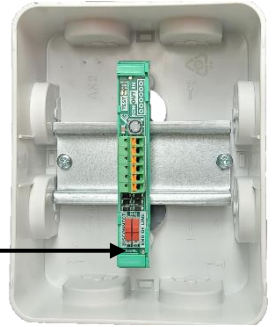
Step 1 Ensure that the extinguishing outputs are safely isolated before starting the test. Open the ETB/BOX

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



Disconnect extinguisher

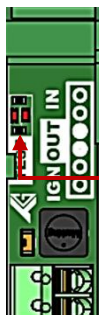
Move all disconnect switches to the **YES** position to disable the aerosol extinguishers. The extinguishers cannot be activated while they are disabled. A disablement condition is indicated as a **fault** on the NANO control panel.



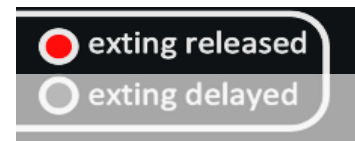
Step 3 Activate the extinguishing release sequence by pressing both yellow Extinguishant Release buttons on the NANO front panel simultaneously.



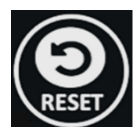
Step 4 Verify the activation indication



To confirm successful activation of the extinguishing system, the **red LEDs** on the Extinguishing Terminal Board (ETB) will flash, and the **red Extinguishant Released LED** on the NANO front panel will illuminate.

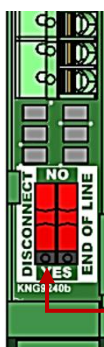


Step 5 **Reset** the system by pressing the Reset button on the NANO front panel.



Restore disconnecting extinguishers

Restore the disabled extinguishers by moving the switch to the **NO** position. The extinguishers are now enabled and ready to

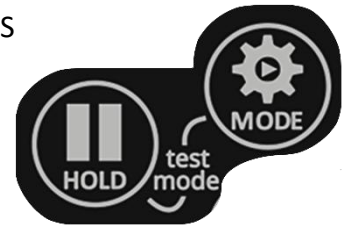


Step 6 Verify that all fault indications have cleared and that the system has returned to normal operating condition.



12.2 TEST THE NANO SYSTEM WITHOUT ACTIVATING THE EXTINGUISHERS

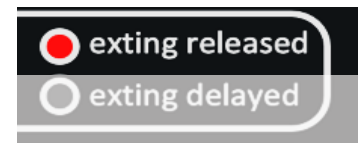
Step 1 To safely disconnect the extinguisher(s), activate Test Mode as described in Chapter 8.7.



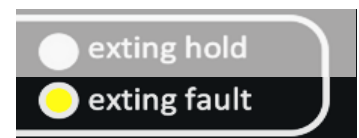
Step 2 Activate the extinguishing release sequence by pressing both yellow Extinguishant Release buttons on the NANO front panel simultaneously



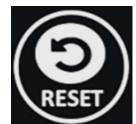
Step 3 To confirm successful activation of the extinguishing system, the red Extinguishant Released LED on the NANO front panel will illuminate.



Step 4 Restore the system exit Test Mode and return the system to normal operation, press the Mode and Hold buttons simultaneously for approximately 1 second. The Extinguish Fault indicator will turn off.

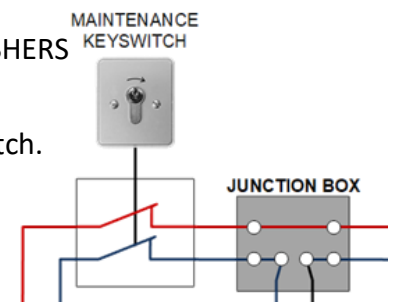


Step 5 Reset the system by pressing the reset button on the NANO front. The FAULT message disappears from the NANO panel.



12.3 TEST THE NANO SYSTEM WITHOUT ACTIVATING THE EXTINGUISHERS

Step 1 Disconnect the extinguisher/s by using the maintenance key switch. A FAULT message appears to the NANO.



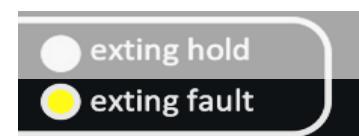
Step 2 Activate the extinguishing release sequence by pressing both yellow Extinguishant Release buttons on the NANO front panel simultaneously



Step 3 To confirm successful activation of the extinguishing system, the red Extinguishant Released LED on the NANO front panel will illuminate.



Step 4 Restore and connect the extinguisher/s by using the maintenance key switch. A FAULT message vanished from the NANO.



Step 5 Reset the system by pressing the reset button on the NANO front. The FAULT message disappears from the NANO panel.



12.4 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.

The following activities shall be carried out by a **Competent Person**. This information is provided as a reference for the **Premises Management**.

- Review previous entries in the system logbook and verify that all required corrective actions have been completed.
- Perform the weekly functional test.
- Check the extinguishers according to the applicable test method (Method 1 or Method 2), depending on the availability of test plugs.
- Check the emergency power supply by disconnecting the mains power supply (PSU1) of the NANO and verifying that the standby power supply (PSU2) operates correctly.

12.5 WEEKLY TESTING

To be conducted by the Premises Management.

- Perform a Lamp Test to verify that all visual indicators and audible alarms on the NANO control panel are functioning correctly.
- If automatic fire detectors are connected, place the NANO system in Manual Only Mode before performing any detector tests.
- Test at least one fire detector to verify correct operation of the control panel and audible alarm devices.
- Inspect the extinguishing system in accordance with the instructions provided by the extinguishing system supplier.

12.6 QUARTERLY INSPECTION AND TESTING

The following activities shall be carried out by a Competent Person. This information is provided as a reference for the Premises Management.

- Review previous entries in the system logbook and verify that all required corrective actions have been completed.
- Perform the weekly functional test.
- Inspect the extinguishers according to the applicable test method (**Method 1 or Method 2**), depending on the availability of test plugs.
- Check the standby power supply by disconnecting the mains power supply (**PSU1**) of the NANO and verifying that the backup power supply (**PSU2**) is operating correctly.

12.7 YEARLY TESTING

The following activities shall be carried out by a Competent Person. This information is provided as a reference for the Premises Management.

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

- Perform the quarterly test.
- Test all fire detection devices, manual extinguishant release buttons, and Hold buttons.
- Clean the control panel enclosure periodically using a soft, damp cloth.



Reservations and Support

K&G GROEP B.V. is committed to continuous improvement and reserves the right to modify product specifications at any time without prior notice. Errors and omissions excepted. Used or replaced electronic equipment contains valuable recyclable materials. Dispose of electronic components in accordance with the local waste disposal regulations applicable in your country. For questions regarding the information provided in this manual, or for technical support, please contact your NANO system supplier.

