Installation & Commissioning Manual – NIV-X Tank Level Monitoring Device

Product Code: NIV-X Series
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What's in the Box

- 📌 **NIV-X Monitoring Unit**
  Main enclosure containing electronics, power input, and communication interfaces.
- 📌 **Submersible Sensor**
  Supplied loose to prevent damage in transit – must be connected to the NIV-X during installation.
- 📌 **Multistep Threaded Tank Adapter**
  Allows secure, sealed mounting of the sensor through different tank lid configurations.
- 📌 **Optional Accessories** (if specified at time of order)
  - High-level float switch
  - Bund float switch
  - External Alarm Box
  - RS485 Modbus communication adapter
- 📌 **Quick-start Installation Manual**
  Printed guide for safe and correct setup.

⚠ Safety Precautions

- ⚠ **Do Not Use with Petrol or Flammable Liquids**
  NIV-X is not certified for use with petrol, aviation fuel, or other ATEX-regulated substances. Use only with diesel, water, oil, or similar non-volatile fluids.

- ⚠ **Install Outside Hazardous Zones**
  This device is intended for use in non-hazardous areas or **Zone 2** environments following a formal site risk assessment. Never install near petrol dispensers or in areas designated as Zone 0 or Zone 1.

- ⚠ **Qualified Installation Only**
  Installation should be performed by a competent engineer familiar with electrical safety, tank fittings, and liquid level measurement systems. Follow all site-specific safety protocols.

- ⚠ **Electrical Compliance Required**
  Ensure wiring and electrical connections comply with **local regulations and electrical standards**. Use appropriate cable glands and sealing to maintain enclosure integrity (IP-rated installation).

- ⚠ **Secure and Clean Installation Area**
  Mount the NIV-X unit on a stable surface and ensure all cables are properly routed and strain-relieved. Keep installation areas dry and free of dust, oil, or other contaminants that could affect performance.

- ⚠ **Sensor Breather Must Remain Clear**
  If your version of the NIV-X includes a breather cap or vented sensor cable, ensure it is not kinked, submerged, or blocked—this is essential for accurate pressure readings.

- ⚠ **Keep Clear of Moving Machinery**
  Avoid running cables or mounting sensors near agitators, pumps, or other mechanical equipment that may interfere with the system or create safety hazards.

🧰 Tools Required

To ensure a safe and successful installation of the NIV-X system, the following tools and equipment are recommended:

- 🔩 **Drill with appropriate bits**
  For mounting brackets or drilling through tank lids (if required for threaded adapters).
- 🪛 **Screwdriver Set (🪛 Flathead and Phillips)**
  For securing terminals, brackets, and enclosures.
- 🔌 **Multimeter**
  For verifying DC/AC voltage at the power supply, sensor terminals, and Modbus communications if applicable.
- 🧵 **Cable Ties and Strain Relief Glands**
  To manage sensor and power cables and protect against stress or mechanical movement.
- 🔧 **Spanners or Adjustable Wrenches**
  For tightening multistep threaded adapters or securing float switch assemblies.
- 🧽 **Cleaning Cloth or Wipes**
  To prepare the tank top or mounting surface, ensuring proper seal and adhesion where necessary.
- 🕳️ **Hole Saw or Step Drill Bit (🕳️)**
  Required only if installing into a tank without pre-drilled entry points for the sensor or threaded fittings.

🔌 Connect the Power Supply

The NIV-X is designed for flexible power configurations. It comes **pre-fitted with a 9V PP3 battery**, which powers the unit as standard and acts as a **backup** if external power is connected.

⚠️ **Important note:**
The battery can **only act as a backup power source** if a **voltage-based sensor** (e.g. 0.5–4.5 V) is used.
If your system is configured with a **current-based sensor** (e.g. 4–20 mA), the battery will **not be able to power the sensor** in the event of a mains failure.

⚙️ Wiring Instructions

📌 NIV-X Terminal Wiring Order & Function Guide

1️⃣ Battery Input – 9V PP3

Primary low-power option.

Terminal	Connection
BAT+	Battery Positive
BAT-	Battery Negative

✓ Ideal for temporary or portable applications

2️⃣ AC / DC Supply Input

External power feed for full operation.

Connection Type	Terminals	Notes
24V DC	+ / -	Max DC mains power input
85–305VAC	G/L / N	AC mains alternative supply

3 External Relay Output

Used for **pumps, valves, alarms, generator start, boiler enable**, etc.

Terminal	Function
COM	Common
NO	Switch closes on alarm/logic event

High-current loads require an external contactor/SSR.

4 Overfill Input

Accepts **mechanical float switch**.

Triggers overfill alarm and or output via relay.

5 Pressure / Level Transmitter Wiring Table

Option A – 4–20mA Current output Sensor

NIV-X Terminal	Sensor Wire	Notes *****To use this mode ensure the 4-20mA switch on the board is in the "ON" position*****
Signal	Blue	Signal 4-20mA
Power	Red	Power **Check pressure sensor documentation or on product body***
Earth	Yellow	Shielding

✓ Best for long cable runs
✓ Immune to electrical noise
✓ Most industrial probes use this type

Option B – 0.5–4.5V Voltage Output Sensor

NIV-X Terminal	Sensor Wire	Notes*****to use this mode-ensure the 4-20mA switch on the board is in the "OFF" position*****
Signal	Blue	Signal 0-5-4.5v
POWER	Red	Power **Check pressure sensor documentation or on product body***
GND	**Black**	Ground
Earth	Yellow	Shielding

*⚠ Voltage sensors should not be run over long distances without shielded cable

⚠ Ensure the max signal never exceeds 5V into SIG input

6 Bund / Leak Switch Input

For **leak tray, containment alarms, bund breach detection**.

Input Type	**Connection**
Mechanical float switch	Bund input

Activates alarm relay when liquid detected around tank.

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7 Modbus Communications (RS-485)

For SCADA/BMS/remote telemetry.

Terminal	**Description**
A(+)	RS485 Data +
B(–)	RS485 Data –
GND	Reference Ground

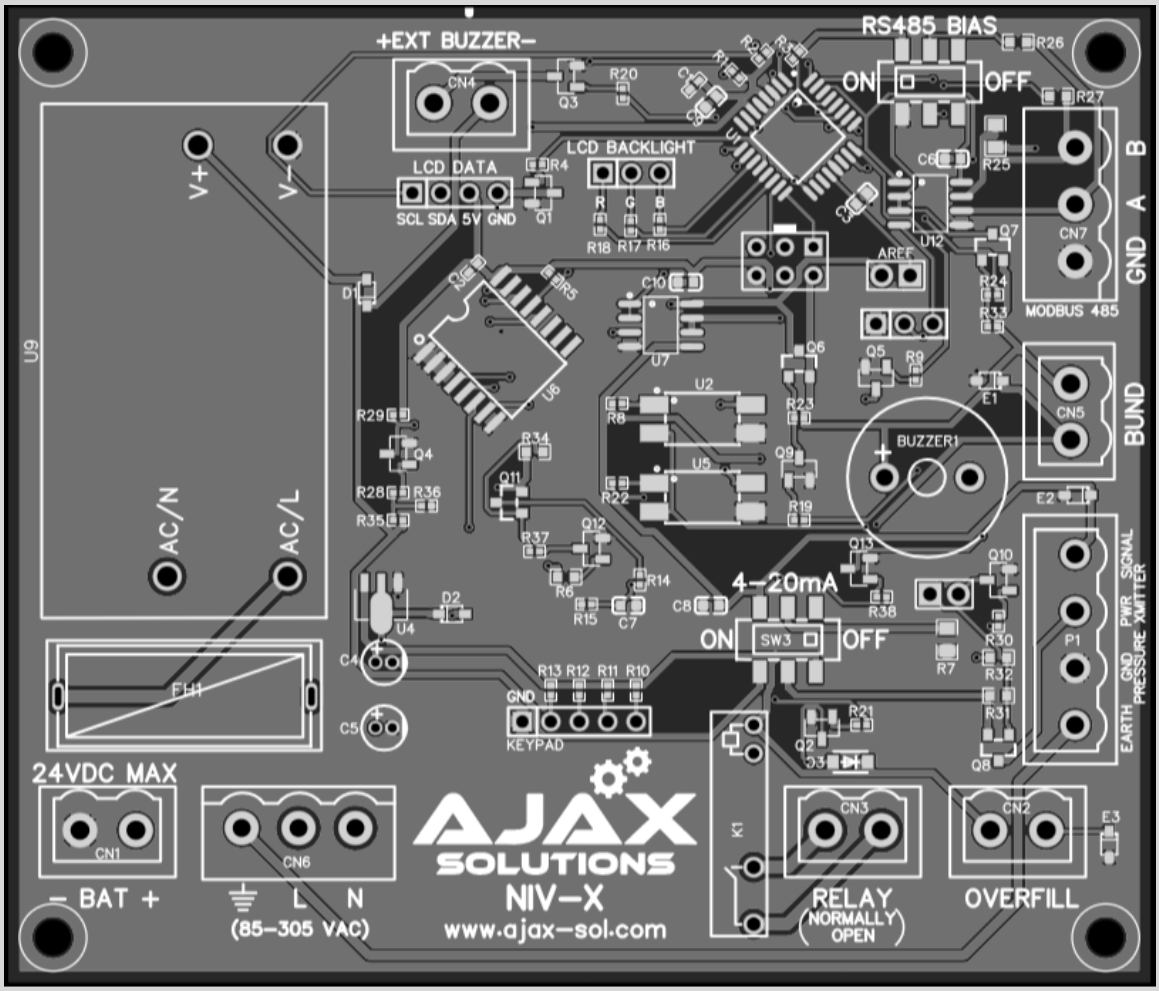
*****Bias Switch should only be in the ON position if RS485 line biasing is not provided by the RS485 master*****

8 External Buzzer Output – Final in sequence

Used for high-volume audible warning.

Pad	Function
+	Buzzer positive drive
–	Ground

Can be used with strobe/sounder panel if required.



✅ Final Check

- Verify all connections are secure and correctly positioned.
- Power on the unit and observe indicator lights or display activity to confirm successful start-up.

🔗 Connect the Communication Interface (Optional)

NIV-X includes digital communication capabilities, such as **RS485 Modbus**, you can connect it to a local controller, BMS, SCADA, or remote monitoring platform.

🔗 Supported Interfaces

- **RS485 Modbus RTU**
- Future-ready: optional support for **4–20 mA** and **0–10 V** analog outputs (check model specification)

🔌 Wiring Instructions

- Locate the **RS485 terminal block** on the internal PCB.
- Connect the following:
    - **A+ (Data +)**
    - **B- (Data -)**
    - **GND (Signal Ground)**
- Use **twisted pair shielded cable** for long-distance or interference-prone environments.
- For reliable RS-485 communication, use 22–24 AWG, 120 Ω twisted-pair, shielded cable.
- Use 22 AWG if your runs exceed a few hundred metres or are in electrically noisy environments.
- Ensure correct polarity – reversing A/B will prevent communication.

🛠️ Configuration

- Verify baud rate, parity, stop bits, and Modbus ID using your configuration interface or commissioning tool.
- If integrating with a SCADA or telemetry system, ensure the register map provided matches your software.

🧪 Testing & Verification

- Power on the system and run a connectivity test using your host device or Modbus scanner.
- Confirm that live data values (e.g., tank level, temperature, alarms) are accessible and accurate.

✅ Final Checks and Commissioning

Before handing over the system or leaving site, complete the following checks to ensure a reliable, long-term installation.

✅ System Integrity

- Confirm that:
    - All wiring (sensor, power, communication) is correctly connected and secured.
    - Cable glands and entry points are sealed to maintain weatherproof integrity.
    - The sensor cable is not kinked, pinched, or under tension.
    - The mounting bracket and tank adapter are firmly fastened.

🔋 Power Verification

- Check that the unit powers on successfully using the default 9V battery or external power supply.
- Observe display for normal startup behaviour.

📊 Sensor Readings

- Allow the sensor to stabilize for 30 seconds after power-up.
- Verify that the tank level reading is present and reasonable.
- If installed 50 mm off the tank base, ensure this offset is reflected in the display or configuration.

🔗 Communication Test (If Used)

- Use a laptop, BMS, or telemetry tool to verify communication with the NIV-X via RS485 or other enabled interface.
- Confirm accurate live data values (level, alarms, temperature if fitted).

📝 Handover Notes

- Record:
    - Tank height
    - Fluid type
    - Sensor installation depth or offset
    - Modbus ID (if applicable)
- Store configuration settings in a secure location or provide them to the site contact.
- Recommend periodic checks (e.g. battery status or data integrity) according to the operating environment.

🧪 Calibration / Configuration

The NIV-X is shipped pre-configured for standard tank installations, but its flexible calibration system allows full customization to suit site-specific requirements. Please refer to the Niv-X Programming Guide

📝 Commissioning Notes

- Document all final settings including:
    - Tank dimensions
    - Sensor offset
    - SG value
    - Alarm set points
    - Modbus ID or analog output range (if applicable)
- Retain a copy of configuration for future maintenance, remote support, or system expansion.

💬 Troubleshooting

Use this guide to diagnose and resolve common issues during installation or operation of the NIV-X system.

Symptom	Possible Cause	Recommended Action
🔇 **No power**	Flat battery, loose connection, or incorrect voltage	Confirm battery voltage or DC/AC input using a multimeter. Re-check wiring to terminal block.
📉 **No level reading**	Sensor not wired correctly, sensor not submerged, or offset too high	Verify sensor wiring to PCB, check that it's suspended ~50 mm above the tank base, and confirm configuration settings.

Symptom	Possible Cause	Recommended Action
🔄 **Erratic readings**	Tank turbulence, cable interference, or blocked breather	Secure sensor away from fill inlets; inspect breather (if fitted) and avoid sharp bends in cable.
🛑 **RS485 not responding**	Baud rate setting incorrect, or Modbus ID setting incorrect, or serial protocol incorrect (should be 8N1)	Check A/B wiring order, ensure Modbus ID, baud rate, parity and stop bits match. Use shielded cable and terminate properly.
🚨 **Alarms not triggering**	Alarm thresholds not set or wrong relay logic	Reconfigure alarm levels in setup; check if relay is set to open/close on alarm as needed.
🔌 **External relay not working**	Relay not enabled or wired incorrectly	Enable relay in software; confirm wiring matches relay diagram. Test with alarm simulation.

🛠️ Maintenance Tasks

🔍 Visual Inspection

- Ensure the sensor cable is free of damage, kinks, or tension.
- Check that mounting brackets are secure and the multistep adapter is not leaking.

🧪 Reading Verification

- Compare digital readings with physical tank dip or known reference level.
- Recalibrate if drift is detected beyond acceptable limits.

🧼 Sensor Cleaning

- If the tank allows safe access, remove and gently clean the sensor diaphragm using a damp cloth or soft brush.

- Avoid abrasive materials or chemical cleaners.

🔋 Battery Check

- For battery-powered units, check the **PP3 voltage** using a multimeter.
- Replace if below 7.5V or if a low battery alarm is triggered.

🚨 Alarm & Relay Testing

- Use the built-in test mode or manually simulate high/low levels to confirm alarm output and relay function.
- Ensure external alarm circuits respond as expected.

📝 Service Log

Keep a record of all inspections, battery replacements, calibrations, and changes to tank configuration.

📦 Packaging & Disposal

Proper handling and end-of-life disposal of the NIV-X system helps protect both users and the environment.

📦 Packaging

- All NIV-X devices are shipped in recyclable cardboard packaging with protective internal padding.
- Retain packaging during installation in case the product needs to be returned or relocated.
- Dispose of packaging materials responsibly through local recycling schemes.

🗑️ Product Disposal

This product must **not be disposed of with general household or commercial waste**.

- The NIV-X contains electronic components, batteries, and circuit boards covered by **UK and EU WEEE (Waste Electrical and Electronic Equipment) Regulations**.
- At end-of-life, the complete device must be taken to an **authorised electrical recycling centre**.
- Remove the **PP3 battery** and dispose of it separately in accordance with local battery collection schemes.

♻️ Environmental Compliance

Ajax Solutions Ltd is committed to environmental responsibility:

- This product complies with:
    - UK WEEE Regulations
    - RoHS Directive (2011/65/EU)

🛡️ Warranty & Support

✅ Standard Warranty

All NIV-X units are covered by a **12-month manufacturer's warranty** from the date of purchase. This warranty applies to:

- Manufacturing defects
- Hardware faults under normal use
- Sensor and electronics performance

🔧 **Warranty covers replacement of parts only**. Labour, site visits, or installation costs are **not included**.

❗Warranty is void if the unit has been damaged by incorrect installation, unauthorised modifications, or exposure to unsuitable fluids (e.g. petrol or solvents).

🛠 Technical Support

Ajax Solutions offers full technical assistance via:

- 📧 Email: **support@ajax-sol.com**
- 🌐 Website: **www.ajax-sol.com**
- ☎️ Phone: **+44 (0)1234 567890**

Support includes:

- Configuration help
- Fault diagnostics
- Wiring and setup clarification
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🔄 Returns & Repairs

If a fault is suspected:

1. Contact Ajax Support to request a **Return Materials Authorisation (RMA)**.
2. Provide the unit's serial number and a brief description of the issue.
3. Return the product in original or equivalent protective packaging.

All returns will be inspected. Replacements or repairs will be issued **at the manufacturer's discretion**, and only for verified part failures.

Legal Disclaimer

The information contained in this manual is provided for general guidance and technical support of the NIV-X Digital Tank Level Monitoring Device. Ajax Solutions Ltd makes every effort to ensure accuracy, but reserves the right to change specifications, features, or product design without prior notice.

⚠ Ajax Solutions Ltd accepts **no liability for loss, damage, or injury** arising from incorrect installation, configuration, or use of this equipment beyond its intended purpose.

It is the installer's responsibility to ensure that the unit is installed in accordance with all local, national, and industry-specific regulations.
