

Remote Control Hydraulic Excavator Wireless Controller System

Product Specification, System Architecture & Integration Manual

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1. EXECUTIVE SUMMARY & OVERVIEW

The Nomi Remote Control Hydraulic Excavator Controller System, engineered by Henan Nomi Electronic Technology Co., Ltd., is an advanced electro-hydraulic proportional wireless control solution designed for heavy excavators, mini-excavators, demolition machinery, and specialized remote digging equipment.

Excavator wireless remote control

International
certification

Signal
stability

Image transmission
remote control

Function
customization



Source
factory

Professional R&D of industrial remote controllers for 20 years

- ✓ logic customization
- ✓ Panel customization
- ✓ function customization

Operating excavators in hazardous environments—such as high-risk slope stabilization, tunnel excavation, hazardous material remediation, and demolition sites—exposes operators to severe safety risks. The Nomi industrial wireless remote control system allows operators to manipulate complex multi-function hydraulic excavators from a safe distance of up to 300 meters with precise line-of-sight visibility. By integrating dual multi-axis proportional joysticks, micro-meter hydraulic oil flow control, and dynamic CAN-bus/PWM signal output, this system delivers smooth, highly responsive, and zero-latency excavation performance under extreme construction conditions.

2. TECHNICAL SPECIFICATIONS

Technical Parameter	Specification & Engineering Value
Manufacturer & Brand	Henan Nomi Electronic Technology Co., Ltd. / Nomi

Technical Parameter	Specification & Engineering Value
Target Machinery	Hydraulic Excavators, Mini Excavators, Demolition Robots, Trenchers
Control Signal Interface	PWM Proportional Output, CAN-bus (J1939 / CANopen), On/Off Relays
Operating Voltage Range	9V DC – 32V DC (Integrated Transient & Reverse Voltage Protection)
Radio Frequency Band	433 MHz / 868 MHz / 2.4 GHz (FHSS Automatic Frequency Hopping)
Control Distance	Up to 300 meters (984 feet) unobstructed line-of-sight
Proportional Response Latency	Less than 12 milliseconds
Joystick Linearity Accuracy	Less than 1 percent error across full deflection range
Enclosure Protection Rating	Receiver IP67 Epoxy Sealed / Transmitter IP65 Shockproof ABS
Operating Temperature	-30°C to +75°C (-22°F to +167°F)

3. KEY SYSTEM FEATURES & ADVANTAGES

Micro-Meter Proportional Hydraulic Control

Dual multi-axis proportional joysticks provide smooth, stepless control over main pump displacement and spool movement. Fine joystick nudges deliver precise hydraulic oil metering for delicate grading and leveling operations, while full joystick deflection enables maximum digging force and bucket speed.

FHSS Anti-Interference Radio Architecture

Utilizes Frequency Hopping Spread Spectrum (FHSS) technology to continuously hop across radio channels in real time. This guarantees uninterrupted wireless communication even on noisy job sites with heavy electromagnetic interference from generator sets, high-voltage lines, or adjacent remote equipment.

Ruggedized Chest-Pack Ergonomics

The transmitter is housed in a heavy-duty, glass-fiber reinforced nylon resin casing with rubber shock bumpers and a padded waist-chest harness. Designed for all-day comfort, it features tactile joysticks, toggle switches, and an oversized safety Emergency Stop switch.

Dual-CPU Hardware Safety Redundancy

Compliant with EN ISO 13849-1 Category 3 PL d safety standards. Dual internal processors monitor transmitter-receiver handshakes and joystick zero-point integrity continuously. Activating the Emergency Stop button instantly drops the main hydraulic pilot safety valve in under 15 milliseconds.

4. SYSTEM PACKAGE COMPONENTS

Item Number	Component Description	Quantity Included
1	Multi-Axis Joystick Transmitter Unit with Padded Shoulder Harness	1 Unit
2	IP67 Epoxy-Potted Industrial Receiver Box	1 Unit
3	High-Gain Omnidirectional External Antenna Assembly with Cable	1 Set
4	Pre-Wired Heavy-Duty Cable Harness with Waterproof Connectors	1 Set
5	Smart Dual-Dock Battery Charger & Rechargeable Lithium Battery Pack	2 Sets
6	Technical Wiring Schematic Diagram & Installation Manual	1 Copy

5. SYSTEM WIRING ARCHITECTURE & PINOUT MATRIX

5.1 Receiver Wiring Lead Assignments

Lead Cable Wire	Signal Function	Target Connection Point	Operation Logic
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Lead Cable Wire	Signal Function	Target Connection Point	Operation Logic
Red (12V/24V +)	System Power Supply Input	Excavator Battery Positive (+24V DC)	Receiver Controller Power Supply
Black (GND)	System Power Ground Input	Vehicle Chassis Ground / Battery Negative	Common Reference Ground
Yellow (E-Stop)	Hydraulic Safety Pilot Valve	Main Hydraulic Pilot Cutoff Solenoid	Cuts Hydraulic Pilot Pressure on E-Stop
Blue (Boom UP/DN)	Boom Proportional PWM Output	Boom Spool Electro-Hydraulic Pilot Valve	Controls Main Boom Lift & Lower Speed
Green (Arm IN/OUT)	Arm Proportional PWM Output	Arm Spool Electro-Hydraulic Pilot Valve	Controls Dipperstick Crowd & Extend
White (Bucket C/D)	Bucket Proportional PWM Output	Bucket Spool Electro-Hydraulic Pilot	Controls Bucket Curl & Dump Action
Orange (Swing L/R)	Swing Proportional PWM Output	Upperstructure Swing Motor Solenoid	Drives Clockwise & Counter-Clockwise Swing
Brown (Travel L)	Left Track Travel Command	Left Track Hydrostatic Pump Pilot Valve	Drives Left Track Forward & Reverse
Gray (Travel R)	Right Track Travel Command	Right Track Hydrostatic Pump Pilot Valve	Drives Right Track Forward & Reverse
Purple (Throttle)	Engine RPM Acceleration Signal	Electronic Engine Governor / ECU Input	Adjusts Engine RPM Speed Settings

5.2 Hydraulic Motion Control Logic

Joystick Action	Primary Output Signal	Hydraulic Valve Action	Machine Movement
Left Joystick Pull Back	Boom UP PWM Signal	Opens Boom Lift Spool	Raises Main Boom Assembly
Left Joystick Push Forward	Boom DOWN PWM Signal	Opens Boom Lower Spool	Lowers Main Boom Assembly
Left Joystick Push Left/Right	Swing L/R PWM Signal	Drives Swing Motor Valve Block	Rotates Upper Structure
Right Joystick Pull Back	Arm IN PWM Signal	Opens Arm Crowd Spool	Pulls Dipperstick Inward
Right Joystick Push Forward	Arm OUT PWM Signal	Opens Arm Extension Spool	Pushes Dipperstick Outward
Right Joystick Push Left/Right	Bucket Curl/Dump PWM	Drives Bucket Cylinder Valve	Curls or Dumps Excavator Bucket

6. STEP-BY-STEP INSTALLATION & CALIBRATION

Step 1 Receiver Box Mounting

Disconnect the excavator battery main disconnect switch. Secure the IP67 receiver unit inside the excavator cab or machinery electrical compartment using rubber shock absorbers. Route the high-gain external antenna to the top of the cab roof for line-of-sight signal coverage.

Step 2 Hydraulic Pilot Valve Interface

Connect the main power supply cables directly to the +24V DC bus bar through an inline 15A fuse. Interface the PWM proportional output wires directly to the electro-hydraulic pilot proportional valves (or pilot pressure conversion block) on the main hydraulic distributor manifold according to the pinout matrix above.

Step 3 Joystick Zero-Point & Flow Calibration

Turn on the receiver calibration mode. Move both joysticks through their full range of motion to register deadband thresholds, minimum startup current (mA), and maximum hydraulic oil flow limits for each spool function.

Step 4 Operational Safety Check

Start the excavator engine in a clear field. Test all boom, arm, bucket, swing, and track travel functions at low engine RPM. Press the emergency stop button while operating; the main hydraulic pilot cutoff valve must disengage immediately to prevent all machine movement.

7. TROUBLESHOOTING & MAINTENANCE

Issue 1 Receiver Status LED Flashes Red Rapidly

Cause and Solution: Input supply voltage drop below 9V DC or RF radio interference. Inspect main battery terminals for corrosion, verify power supply voltage, and check antenna coaxial connections.

Issue 2 Excavator Motion Is Jerky or Hesitant

Cause and Solution: Incorrect PWM frequency setting or hydraulic valve spool stiction. Adjust the PWM output frequency in the receiver setting menu to match the pilot solenoid coil specification (typically 100 Hz – 200 Hz).

Routine Maintenance Schedule

Inspect pre-wired cable harnesses and hydraulic solenoid connectors every 100 operating hours for physical wear or moisture ingress. Wipe down the transmitter joysticks and rubber boots using a clean, dry cloth after operating in muddy or dusty environments.

8. COMPANY INFORMATION & TECHNICAL SUPPORT

Manufacturer: Henan Nomi Electronic Technology Co., Ltd.

Official Website: <https://www.spiremade.com>

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Product Specialization: Hydraulic Excavator Remotes,
Electro-Hydraulic Proportional Controllers, Concrete Pump Truck
Wireless Systems, Overhead Crane Radio Controls.